GEORGIA INSTITUTE OF TECHNOLOGY
OFFICE OF CONTRACT ADMINISTRATION
SPONSORED PROJECT INITIATION

no action as of 2/1/77 OH

Date: November 22, 1976

Project Title: A Study of Rural Small Industry Problems and Potentials

Project No: A-1917

Project Director: Raymond Manoff

Sponsor: U. S. Agency for International Development

Agreement Period: From 10/27/76 Until 1/31/77

Type Agreement: Contract No. AID/NE-C-1281 (Tunisia)

Amount: $16,400

Reports Required: Report of Recommendations; Findings; Final

Sponsor Contact Person (s):

Technical Matters

Office of Technical Support (NE/TECH)
Agency for International Development
Washington, D. C. 20523

Contractual Matters
(thru OCA)

Regional Operations Division - NE
Office of Contract Management
Bureau for Program and Management Services
Agency for International Development
Washington, D. C. 20523
Attention: CM/ROD/NE

Defense Priority Rating:

Assigned to: Economic Development Laboratory (School/Laboratory)

COPIES TO:

- Project Director
- Division Chief (EES)
- School/Laboratory Director
- Dean/Director—EES
- Accounting Office
- Procurement Office
- Security Coordinator (OCA) ✓
- Reports Coordinator (OCA)
- Library, Technical Reports Section
- Office of Computing Services
- Director, Physical Plant
- EES Information Office
- Project File (OCA)
- Project Code (GTRI)
- Other

CA—3 (3/76)

GEORGIA INSTITUTE OF TECHNOLOGY
OFFICE OF CONTRACT ADMINISTRATION

SPONSORED PROJECT TERMINATION

No action
CA-2
OAL

Date: April 7, 1977

Project Title: A Study of Rural Small Industry Problems and Potentials

Project No: A-1917

Project Director: Raymond Manoff

Sponsor: U. S. Agency for International Development

Effective Termination Date: 1/31/77

Clearance of Accounting Charges: 1/31/77

Grant/Contract Closeout Actions Remaining:

- x Final Invoice and Closing Documents
- _ Final Fiscal Report
- _ Final Report of Inventions
- _ Govt. Property Inventory & Related Certificate
- _ Classified Material Certificate
- _ Other _____

Assigned to: Economic Development Laboratory (School/Laboratory)

COPIES TO:

Project Director
Division Chief (EES)
School/Laboratory Director
Dean/Director—EES
Accounting Office
Procurement Office
Security Coordinator (OCA) ✓
Reports Coordinator (OCA)
Library, Technical Reports Section
Office of Computing Services
Director, Physical Plant
EES Information Office
Project File (OCA)
Project Code (GTRI)
Other _____

CA—4 (3/76)

A STUDY OF RURAL SMALL INDUSTRY PROBLEMS AND POTENTIALS (ASSOCIATED WITH RURAL DEVELOPMENT IN THE SOUTHERN SILIANA AREA OF TUNISIA)

A STUDY OF RURAL SMALL INDUSTRY PROBLEMS AND POTENTIALS (ASSOCIATED WITH RURAL DEVELOPMENT IN THE SOUTHERN SILIANA AREA OF TUNISIA)

Prepared for

The Ministry of Plan, Republic of Tunisia

and the

Agency for International Development, Mission to Tunisia
Under Project 664-11-190-285

by

Nelson C. Wall

Contract No. AID/NE-C-1281

International Programs Division
Economic Development Laboratory
Engineering Experiment Station
GEORGIA INSTITUTE OF TECHNOLOGY
February 1977

A-1917

ERRATA

The following errors have been identified in the report entitled A Study of Rural Small Industry Problems and Potentials (Associated with Rural Development in the Southern Siliana Area of Tunisia) prepared for the Ministry of Plan, Republic of Tunisia, and the Agency for International Development, Mission to Tunisia, by Nelson C. Wall, under Contract No. AID/ne-c-1281, Georgia Institute of Technology, February 1977.

Page 4 — Line 4: Siliana now is one of four such provinces.
Line 7: Change d'El Krib to El Krib.
Line 10: Change Tunis to Tunisia.
Line 11-13: Kairouan, Le Kef, and Kasserine cities are not in Siliana province.

Page 5 — 3rd paragraph: Sbiba is not in the project area or in fact in Siliana province.

Page 7 — First paragraph: Omda is the title of an official; his unit is a sector or secteur.

Page 29 — Table 7: The designations "P" and "C" before the road numbers should respectively be changed to GP or to MC. The Beni Hazem and the Kessra roads branch off the GP 4, and are not part of that road.

Page 53 — Correct spellings are Hermon S. Davis, Abderrazak Rekhis, Hachemi Ben Slimane.

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* * *

Maps

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Maps (Continued)

Tables

Figures

TUNISIAN ABBREVIATIONS USED IN THIS STUDY

AFI	- Agence Fonciere Industrielle
API	- Agence de Promotion des Investissements
ASEDEAR	- Association pour le Developpement et l'Animation Rurale
BNT	- Banque Nationale de Tunisie
BT	- Banque de Tunisie
CA	- Centre d'Artisanat
CFPA	- Centre de Formation Professionnelle Agricole
CIE	- Commission Interdepartementale d'Etudes
CLCM	- Caisse Locale de Credit Mutuel
CNEA	- Centre Nationale d'Etudes Agricole
CNEI	- Centre Nationale d'Etudes Industrielles
CRDA	- Commissariat Regional de Developpement Agricole
DF	- Direction des Forets
ENA	- Ecole Nationale d'Administration
FF	- Ford Foundation
FOPRODI	- Fonds de Promotion et de Decentralisation Industrielle
GRDA	- Gouvernement Regional du Developpement Agricole
ME	- Ministere de l'Equippement
MEN	- Ministere de l'Economie Nationale
OCT	- Office des Cereales Tunisiens
OEP	- Office de l'Elevage et des Paturages
ONA	- Office Nationale de l'Artisanat
OTTEEFP	- Office des Travailleurs Tunisiens l'Etranger de l'Emploi et de la Formation Professionelle
PMI	- Protection Maternelle Infantile
PSD	- Maison du Peuple
SEPIT	- Societe d'Etudes des Projets Industriels Tunisiens
SHTT	- Societe Hoteliere et Touristique de Tunisie
SIE	- Service de l'Infrastructure et de l'Environment
SONEDE	- Societe Nationale d'Exploitation et de Distribution des Eaux
SRTK	- Societe Regionale des Transports du Kef
STEG	- Societe Tunisienne d'Electricite et de Gaz
UGET	- Union Generale des Etudiants Tunisiens
UGTT	- Union Generale des Travailleurs Tunisiens

UNA - Union Nationale des Agriculteurs

UNFT - Union Nationale des Femmes Tunisiennes

UTICA - Union Tunisienne de l'Industrie, du Commerce, et de l'Artisanat

INTRODUCTION

Background of Study

This report is based on a research study of rural small industry problems and potentials in a selected geographical area of the Republic of Tunisia conducted by the Economic Development Laboratory (EDL) of the Engineering Experiment Station at the Georgia Institute of Technology through its International Programs Division (IPD). The study was conducted for the Government of the Republic of Tunisia, the Ministry of Plan, and the U.S. Agency for International Development (USAID) Mission in Tunisia.

Field research was initiated on November 3, 1976, by a three-man team--Raymond A. Manoff, Milan Radovic, and Eric E. Ericsson--representing the International Programs Division. On January 19, 1977, Mr. Radovic returned to Tunisia for additional field research and data gathering, completing this second phase on February 2, 1977. Nelson C. Wall, Chief of the International Programs Division, was on site for a two-week period in December 1976 to provide necessary guidance to the research activities. He also was responsible for the final compilation of this report and for developing pertinent conclusions and recommendations relating to rural small industry problems and potentials in the study area.

Priority and Relevance

Goal. The overall goal of the integrated rural development program, of which this study is a part, is to improve the level of income and the conditions of life of the rural inhabitants presently populating a segment of the mountains and steppe-zone of central Tunisia.

Purpose. In attaining this overall goal, a particular purpose is to study and recommend actions within the project that (1) generate a change in the economy of the project area population, (2) increase rural incomes, and (3) improve the quality of life for the inhabitants of the communities and households within the project area. It is anticipated that these actions, when implemented, will directly benefit a number of persons now classified as rural poor and will favorably affect the rural labor force, the consumer, industrial production, and other sectors of the economy.

Objectives of Study. The specific objectives of the study upon which this report is based were to accomplish the following:

1. Analyze the present status of rural businesses, industries, crafts, and service and repair enterprises in Makthar and Ruhia delegations of Siliana province.
2. Identify activities, goods, or services presently in short supply, not available in the area, or presently being imported.
3. Identify area agricultural and other resources that have potential for use in processing or manufacturing in the area.
4. Analyze the potential of traditional and new craft industries of the cottage type.
5. Develop recommendations for the expansion and diversification of existing enterprises and the generation of new activities aimed at employment generation and income improvement.

Target Group. The study was limited to the project area, which includes two of the seven delegations of the province of Siliana. The population of the two target delegations, Makthar and Ruhia, totals about 58,000 persons, with the vast majority identified by any standard as "rural poor." This target group faces two basic problems: (1) low agricultural productivity and (2) low level of delivery services to both communities and individual households.

Contents of Report

The sections that follow in this report present the findings of the study in a deductive sequence. The initial chapter is devoted to an overview of the project area, summarizing pertinent data relating to the area's history, geography, demography, and social structure; the economic activities associated with the area's agriculture, industry, and trade; and the infrastructure of the project area. The exposition of these data provides the basis for the following section identified as "Project Analysis," in which the potentials for the development of small industry, agro-industry, tourism, and technological training and application are examined.

The significant conclusions and recommendations are summarized in the final section of the report. Here are enumerated the physical and human constraints to rural development that are evident in the project area overview

and identified in the project analysis. Also provided in this section are recommendations for institutionalizing a rural small-scale industry program and a refinement of previously analyzed development possibilities that identifies and recommends those that offer the greatest potential for immediate pursuit.

OVERVIEW OF PROJECT AREA

The province of Siliana is one of the 18 provinces that form the Republic of Tunisia and it is also the newest of these provinces, having been created in 1974.[1/] It is located in the central interior of the nation and is one of the three provinces that have neither a seacoast nor an international boundary. Topographically, the area is segmented by mountain chains which, in turn, form valleys and plains throughout the province. There are seven delegations in the province of Siliana--Siliana, d'El Krib, Bouarada, Gaafour, Robaa, Makthar, and Ruhia--with a total population estimated at 192,668 persons,[2/] of whom 40,398 live in the delegation of Makthar and 17,040 in that of Ruhia. Of the 155 municipalities (communes) of Tunis, the province of Siliana contains Kairouan (population 54,500, ranks 6th), Le Kef (28,000, ranks 18th), and Kasserine (22,500, ranks 24th), with the remaining municipalities having less than 7,000 inhabitants.

The project area is identified as the two delegations of Makthar and Ruhia. In this chapter, detailed information on these two delegations will be presented.

Historical Summary

The history of the project area dates back into antiquity. The city of Makthar apparently was built to serve as a fortification (military center) shortly after the creation of the Kingdom of Numidia by Massinissa (238? - 149 B.C.).[3/] The city of Makthar and the general area successively were Roman, Libyo-Punic, Byzantine, and Muslim. The present city of Makthar was built about 1890 after the French Protectorate of Tunis was established. During the second World War, the area of Makthar was again a battlefield. Finally, during the struggle for independence, the Tunisian nationalists were active in the general area of Makthar.

[1/] Republique Tunisienne, Ministere du Plan. Recensemment General de la Population et des Logements du 8 Mai 1975, Tunis 1975.

[2/] Republique Tunisienne, Ministere du Plan. Projet de Developpement Rural Integre du Sud du Gouvernorat de Siliana, Tunis, June 1976, Annexe II, p. 1.

[3/] Webster's New Collegiate Dictionary, G & C Merriam Co., Springfield, Mass., U.S.A., 1958.

Geographical Summary

The project area has a total 144,300 hectares which cover about 1,440 square kilometers of mountains and steppes. The principal mountain ranges in the area average between a minimal altitude of about 400 meters to a maximum of 1,200 meters above sea level. Altitudes range from 888 meters to 937 meters in the general area of the town of Makthar, from 592 meters to 1,212 meters in Ruhia, and from 594 to 1,133 meters in Kessra.[1/]

From the point of view of movement of industrial goods and raw materials, the target area is rugged and mountainous. The center of the area is about 130 kilometers west of the city of Sousse and 150 kilometers southwest of the capital city of Tunis. Map 1 shows the project area within the Republic of Tunisia.

Two weather stations are in the target area--one at Makthar which has been in operation for 76 years (1900-1976) and the other at Sbiba that has been in operation since 1970.

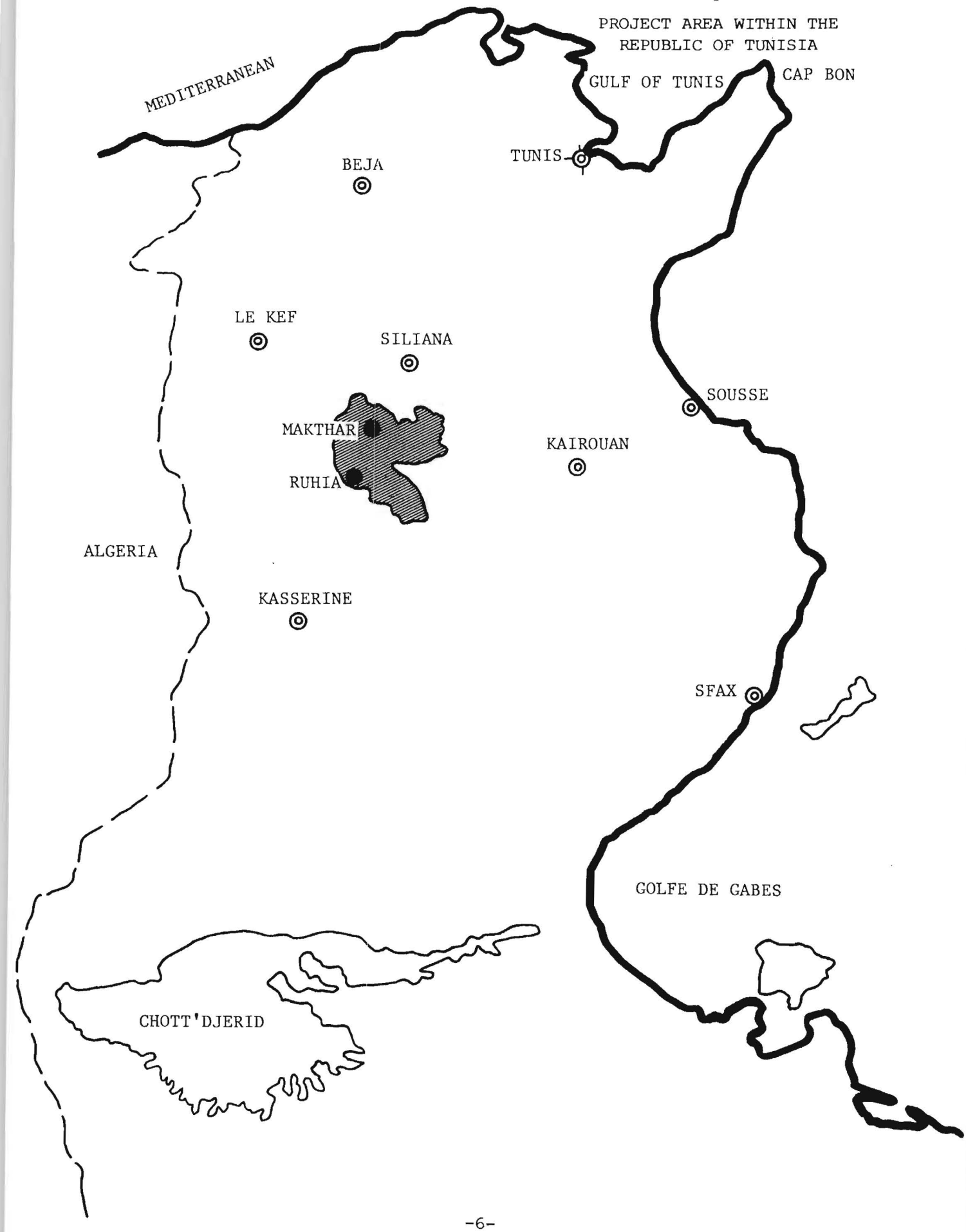
According to field data gathered in loco, the average high temperature at Makthar is about 32.6°C and the low about 3.2°C, with July and August being the hottest months and January the coldest. Some snowfall is registered for most years, with frost occurring each year and hailstorms being a common occurrence. Rainfall, on the other hand, averages about 500 millimeters per year for Makthar. The Sbiba station reports temperatures ranging from a low of 4.0°C to a high of 34.5°C, with precipitation averaging 325 millimeters for the past year.

The project area has sufficient yearly precipitation to support selected agricultural activities; however, it should be remembered that this rainfall takes place in the months of October through April. The rugged topography creates swift currents during the rain periods which erode the soil. The fast currents, poor drainage, and sudden floods, in turn, do great damage to the few roads and animal tracks. During the summer months, relatively high winds carry away the soil as dust and further damage is done to the land.

[1/] Republique Tunisienne, Ministere du Plan, Projet de Developpement Rural Integre du Sud du Gouvernorat de Siliana, Tunis, June 1976, Annexe I, p. 3.

Map 1

PROJECT AREA WITHIN THE REPUBLIC OF TUNISIA



Population Summary

As indicated earlier, the delegation of Makthar has a population of about 40,400 and Ruhia[1/] has about 17,100 inhabitants. This population is distributed over 19 administrative sectors (Omda), of which 13 are in the Makthar delegation and six in the Ruhia delegation. The distribution of this population is presented in Tables 1 and 2 of this document. Map 2 presents the different sectors within the two delegations.

Table 1

POPULATION DISTRIBUTION BY SECTORS
DELEGATION OF MAKTHAR

Sector	Population	Area (Km^2)	Population Density (Persons/Km^2)
Makthar	6,068	6.50	933.53
Sayar	3,695	37.22	99.27
Mansoura	4,131	116.60	35.42
Kessra	3,895	125.50	31.03
El Garia	2,243	82.30	27.25
El Fdhoul	1,620	48.75	33.23
Beze	4,723	99.00	47.70
Beni Hazm	2,050	32.13	63.80
Ras El Oued	1,805	24.12	74.83
El Garaa	2,510	57.25	43.84
Saddine	2,286	38.07	60.04
Soualem	3,132	86.45	36.22
Ellouza	2,231	70.05	31.84
Total	40,389	823.94	49.01

Source: Republique Tunisienne, Ministere du Plan, Recensement General de la Population et des Logements du Mai 8, 1975, Tunis 1975.

[1/] In this report, a consistent spelling has been used for each place name; therefore, Ruhia = Rohia; Makthar = Maktar; Kessra = Kesra = Kisra; Jmilet = Al Jamilat; Le Kef = Al Kaf = El Kef. The Arabic term Wilaya may be Province, Governorate and Region.

Map 2
POLITICAL DIVISION OF THE
DELEGATIONS OF MAKTHAR AND RUHIA

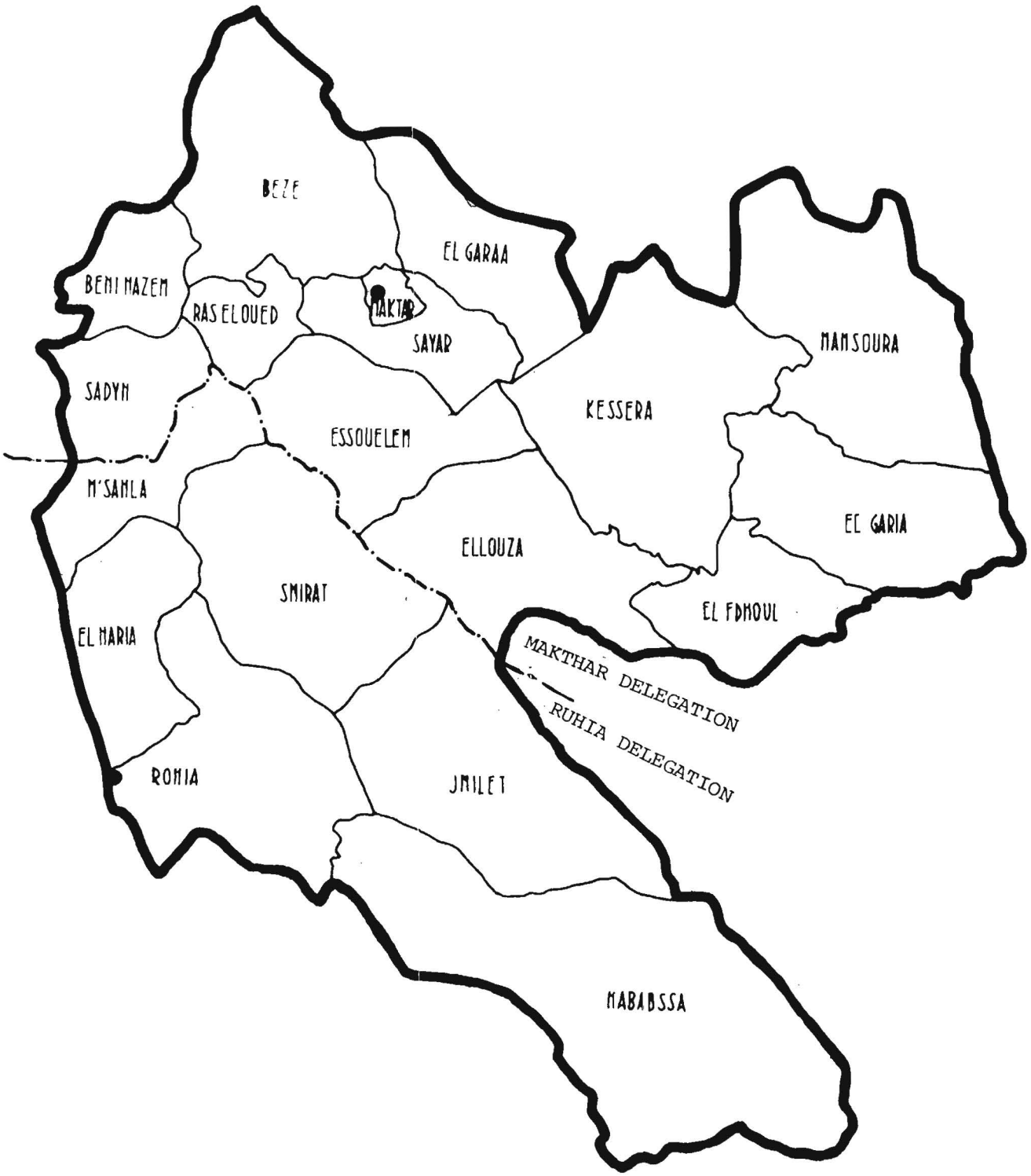


Table 2

POPULATION DISTRIBUTION BY SECTORS
DELEGATION OF RUHIA

Sector	Population	Area (Km^2)	Population Density (Persons/Km^2)
Ruhia	4,592	99.90	45.96
El Haria	2,398	53.13	45.13
M'shala	1,033	42.27	24.43
Smirat	2,444	98.87	24.71
Jmilet	1,608	117.95	13.63
Hdabsa	4,965	206.45	24.04
Total	17,040	618.57	27.54

Source: Republique Tunisienne, Ministere du Plan, Recensement General de la Population et des Logements du Mai 8, 1975, Tunis 1975.

Analysis of these two tables shows that with a land area of 1,442.51 square kilometers in the two delegations and a population of 57,429 persons, the target area has a habitational density of 39.81 persons per square kilometer; in other words, it is a dispersed population. Furthermore, these two delegations represent about 25% of the land area of the province (Siliana province contains about 5,758 square kilometers) and nearly 30% of its inhabitants (the province has a population of about 192,668); in other words, these two delegations, although not heavily populated, have a higher population density than the balance of the province.

From the small rural industry point of view, it is of interest to note that about 15.7% of this population of 57,429 persons is considered "urban" and the balance is rural population. Table 3 highlights this fact.

These 57,429 inhabitants fall into a distribution pattern of about 5.8 persons per household over some 10,000 lodgings occupied by some 9,759 households. The total is divided by sex into 29,523 males and 27,906 females, or about 52% male and 48% female. The same source further indicates that about 51% of the population is under 15 years of age, and about 6% is over 60 years of age; this leaves about 43% of the total population, or about 24,700 persons, in the potential work force. If the census data are correct, 51% of these persons should be males, a ratio of about 12,600 men to 12,100 women.

Table 3

URBAN-RURAL POPULATION OF THE
DELEGATIONS OF MAKTHAR AND RUHIA

	Urban		Rural				
			Agglomerated		Dispersed		
Delegation	Total	%	Total	%	Total	%	Total
Makthar	6,070	15	11,988	30	22,331	55	40,389
Ruhia	1,181	7	3,383	20	12,476	73	17,040
Total	7,251	12	15,371	27	34,807	61	57,429

Source: Republique Tunisienne, Ministere du Plan, Recensement General de la Population et des Logements du Mai 8, 1975, Tunis 1975.

The Ministere du Plan considers that the potential active population for the area in question is 17,000 persons, of whom 13,000 are male and the balance female. This population is employed as follows, according the Ministere du Plan:

Agriculture	5,000 persons
Business, Crafts, Public Servants	1,500
Teachers	600
Migrant Labor	1,400
Estimated Employment	8,500

Although the employed labor force earns an income, the amount earned is difficult to quantify. A study conducted by the Government of the Netherlands, in cooperation with the Republic of Tunisia, indicates that farmers in the Le Kef area need to cultivate 15 hectares to produce an income equal to the minimum agricultural wage or to the per capita income of 35 Tunisian dinars.[1/] The nonagricultural employment in the area is practically negligible. (See Industrial Summary.)

Social Summary

This subject is touched upon at this time because it too is very relevant to the conclusions regarding the constraints on development and the development possibilities that were presented at the start of this study.

[1/] Republique Tunisienne, Ministere de l'Agriculture, Le Developpement Agricole dans le Gouvernorat du Kef, Universite Agronomique Wageningen, Tunis, May 1975, pp. 32-46.

Most of the rural population of the target area lives in one- or two-room dwellings, 5.8 persons to a dwelling. Construction materials are rock, where available, or mud brick reinforced with stone or wood. Most of these dwellings have no water, and a substantial amount of effort and time has to be devoted to hauling water from the watering points to the dispersed dwellings. In other cases where water exists in sufficient amounts, the proper infrastructure has not been established and conditions at the spring or well may render the available water dangerous to humans (as in the case of Kessra).

Sanitation and health service, in general, appear to be at low levels in the target area, although no data were available on this subject. It was determined that a 40-bed medical center (hospital) is located at Makthar. Only 40 hospital beds and two doctors are available to serve a population of over 57,000 persons in the Makthar and Ruhia delegations.[1/] There is a pharmacy at Makthar, but none could be identified in Ruhia. Water may be the single greatest threat to the health of the population. Most rural water points are maintained in an unsanitary manner; animals and humans share the water sources with no regard for health requirements.

To serve the population, there are 30 primary schools in the project area, of which 21 are in Makthar and nine in Ruhia.[2/] The primary school enrollment is about 70% male and 30% female. There are 106 instructors for the 6,497 students, giving a students-to-instructor ratio of 61. The number of qualified students passing the entrance examination required for the secondary level is very low. No high school education is available at present in Ruhia, but those who make it to the second level attend the Lyceé Technique Mixte in Makthar (for details, refer to Appendix 1, Wednesday, November 10, 1976), a coeducational institution.

Few cultural activities are available in the area. There are a few private television sets, no commercial movie theater, some transistor radios, and the Maison du Peuple. On the historical/archeological side, the area has much more to offer. There are partially excavated ruins, several small museums, and artifacts are on display throughout the area.

[1/] Republique Tunisienne, Ministere du Plan, Projet de Developpement Rural Integre du Sud du Gouvernorat de Siliana, Tunis, June 1976, Annexe III, p. 6.

[2/] Op. cit., Annexe II, p. 11.

Agricultural Summary

The agriculture of the project area has been covered in detail by the Projet de Developpement Rural Integre du Sud du Gouvernorat de Siliana in its Annexe IV. The following general summary includes some late revisions based on the updated figures acquired through personal interviews with the Agriculture Office in Siliana and other locations. (Appendix 1 contains detailed information on the interviews conducted.)

Grazing Land

Type	Surface (hectares)
Forest	43,000
Public concourse	15,000
Fallow	20,000
Spring barley	6,500
Hay	43,000
River bank	7,200
Cactus (estimation)	3,000
Uncultivated	14,400
Orchard	4,000

Irrigated Land

	Hectares Irrigated 1975-76		
Type	Ruhia Sector	Haria Sector	Total
Cereals	724	520	1,450
Vegetables	102	23	125
Forage	20	43	63

Crop Production. In 1975, some 20,500 hectares of the target area were in crops and the production was as follows:

Crop	Quintals Produced
Hard wheat	56,944
Soft wheat	2,388
Barley	14,177
Other	80
	73,589

Orchards

Type	Number of Trees	
Almonds	110,000	
Apples	38,000	(Makthar only)
Pears	13,000	(Makthar only)
Figs	25,000	(Makthar, Kessra, Jarred Sectors)

Apiculture. The two delegations have 135 apiculturists, operating 2,030 traditional hives and 43 modern hives to produce 10,257 kilograms of honey in 1975.

Animal Population. The veterinary officer visited on November 19, 1976 (see Appendix 1) indicated that the annual slaughter of cattle was estimated at 100% of the population figure, and the sheep slaughter at 150%, yet it was further estimated that both populations remain static over the year.

Type of Animal	Population in Makthar	Population in Ruhia
Cattle	6,600	3,300
Sheep	43,850	22,150
Goats	31,400	4,600
Asses 45%, Horses 35%, Mules 20%	8,300	5,000

Farm Equipment. The Makthar delegation registers 73 tractors and four caterpillars; in Ruhia, there are 46 tractors and five caterpillars registered.

Industrial Summary

The project area presently has no significant industrial activity, although a few shops and small industries do exist. The on-site research has generated the following data:

MAKTHAR

Type of Activity	No. of Shops
Carpentry	5
Automotive repairs	4
Electrical repairs	1
Electronics	0
Blacksmith	1

MAKTHAR (Continued)

Type of Activity	No. of Shops
Camera/Xerox	2
Leather work	0
Bakery	2
Stone mason/cutter	5
Flagstone mason	- (several individuals)
Watch repair	1
Stone crusher	1
Plumber	- (3 individuals)

RUHIA

Type of Activity	No. of Shops
Automotive repair	1
Blacksmith	1
Plumber	- (3 individuals)
Mason	- (3 individuals)

Complete details of the survey of industrial services conducted in the project area are presented in Appendix 2 of this study. From the summary presented, it is deducted that there are 24 industrial types of shops or activities available in the two main cities of the project area and that they probably serve all of the population of the area.

Industrial Legislation. The industrial investor in Tunisia has two systems available to him under the present laws that offer some benefits in connection with capital investment in manufacturing activities.

1. The Capital Investment Code, which is applicable to local industries and is fully regulated by Bill 74-74 of August 3, 1974.
2. The Special System, which is only applicable to exporting industries and is regulated by Bill 73-28 of April 27, 1972.

Under either of the two, the investor needs first to apply to the Investment Promotion Agency (API) and to provide the following data:

1. Disclosure of the enterprise and of its owners, major shareholders, and company management.
2. Full details of the intended project.
3. Description of product(s) to be manufactured and market potential (internal or export).

4. Complete list of manufacturing equipment.

5. Size of capital investment and manner in which financing is anticipated.

6. Anticipated growth of both output and earnings of the enterprise.

The documentation is then reviewed by either the Board of Directors (projects over US$500,000), which meets once a month, or the Internal Committee, which meets weekly. The API indicates that from presentation to the issuance of the Certificate of Approval, an eight-week interval is usually needed. The investor is then granted a one-year time period from date of issuance of the Certificate of Approval to commence operation. If at the end of one year he is not in operation, the approval may be withdrawn.

The following types of "companies" are usually established in Tunisia:

1. Societe Anonyme. Standard type of joint stock company in which all the capital is contributed by the shareholders. Must have at least seven shareholders; they are liable for the company's debts only to the extent of the amount of capital they invested.

2. Societe à Responsabilite Limitee. This type of association also allows the shareholder to restrict his liability to the amount of his contribution. Can be established by two persons (typical small-scale industry). Must have a minimum capital of 1,000 Tunisian dinars (about US$2,400).

Once the company is legally formed, it then needs to:

1. Cover all formalities common to the establishment of a partnership or company.

2. Attend to formal registration and public announcement.

3. In the case of exporting, cover the requirements of Bill 72-38.

The Investment Promotion Agency of Tunisia (at 18 Ave. Mohamed V, Tunis) offers a publication entitled The Industrial Investor's Guide to Tunisia which details how each step is to be carried out by the investor. In addition, the national or foreign investor should check the following laws in the event they are applicable:

Law 69-35	June 26, 1969
Decree 74-793	August 14, 1974
Law 74-74	August 3, 1974
Law 72-38	April 27, 1972

Industrial Manpower. The government of Tunisia has established the Basic Collective Agreement and a series of collective agreements designed for different industrial sectors (building, manufacturing, garments, metal construction, leather, textiles, and others). These agreements are between the UGTT and the UTICA, and they govern all the workers employed in a given industry. They lay down the regulations relating to the employment of industrial manpower in Tunisia.

1. Hiring. All hiring, in principle, is dealt with by the regional and local employment office. At the time of hiring, the worker must be informed, in writing, of the industry to which he is being assigned and the wate rate he will receive.

2. Work Week. Two work weeks are used (40-hour week and 48-hour week). The following industries use a 48-hour week: building, metal construction, footwear, graphics, paper, photography, and textiles. Exceptions are required for security guards and others, as well as overtime pay in either the 40- or 48-hour week.

3. Holidays. All employees must have 24 consecutive rest hours per week. They also have seven paid national holidays. The vacation is usually set at 1.5 days per month of work, not to exceed 24 days of vacation annually.

4. Wages. Table 4 presents, in summary manner, some of the minimum hourly rates established by UGTT and UTICA in 1975. To update the established rate, one must add 15 millimes per hour for unskilled categories, 10 millimes per hour to all others, plus an across the board 33% increase effective February 1, 1977.[1/]

5. Fringe Benefits. The fringe benefits provided by the employer include vocational training tax, National Social Security, annual leave, national holidays, retirement, industrial medicine, work clothing, insurance and pay forms, all of which adds up to an additional 35-1/2% contribution by the employer per dinar paid.

A booklet entitled Social Legislation for Workers and Labour Costs in Tunisia, published in October 1975, is available from the Investment Promotion Agency of Tunisia upon request. This booklet has detailed information on industrial labor costs in that country.

[1/] Source: lead article, front page of the newspaper L'Action, January 20, 1977.

Table 4

MINIMUM HOURLY RATES BY ACTIVITY
UGTT-UTICA, 1975

Industrial Activity	Hourly Rate (Millimes/Hr.)		
	Unskilled	Semiskilled	Highly Skilled
Ready-Made Clothing	145	183	275
Footwear	145	153	220
Leather and Skins	145	160	225
Metal Construction	145	218	329
Printing, Photography	145	170	310
Electrical	145	170	270
Textiles	145	170	250

The manpower situation in the project area has been indicated to be one of underemployment or unemployment, according to the data presented in the Population Summary. More specifically, it can be said that although wage rates are uniform throughout the nation, an employer based on supply and demand can pay more than the minimum for a given task. In Tunis, for instance, a lathe operator will get more per hour than the same skilled person in Makthar, as the latter will receive only the minimum rate. This tends to encourage the skilled workers to migrate toward the more productive (better paid) areas of the nation.

Tables 5 and 6 present figures for employment in the area that were developed from the many meetings with OTTEEFP staff in the project area.

Both Tables 5 and 6 were developed from data gathered through personal interviews in the project area, as shown in Appendix 1 of this study. All figures are offered as tentative since no formal census approach was utilized.

Trade Summary

Little appears to be available to enter the marketing system of the project area. The agricultural production exceeds family needs, but not by much; only those farmers who are farming 10 or more hectares have that possibility, according to the Tunisia-Netherlands study of Le Kef. If this is correct, then about 30% of the farmers do not produce enough wheat to feed their families and must, therefore, enter the market system as buyers.

Table 5

EMPLOYMENT BY ACTIVITY AND SEX
MAKTHAR 1976

Activity	Employed		Underemployed		In Training		Total	
	Male	Female	Male	Female	Male	Female	Male	Female
Administration	652	31	5	2	20	-	677	33
Construction	450	-	200	-	-	-	650	-
Commercial	232	-	20	-	-	-	352	-
Forestry	172	-	150	-	-	-	322	-
Agriculture	4,000	-	1,200	-	9	-	5,209	-
Mechanics	10	-	2	-	12	-	24	-
Woodworking	10	-	1	-	10	-	21	-
Baking	12	-	1	-	2	-	15	-
Wood Engraving	23	-	-	-	12	-	35	-
Carpet Weaving	-	110	-	14	-	40	-	164
Sewing	-	30	-	-	-	30	-	60
Electrical	10	-	2	-	5	-	17	-
Total	5,571	171	1,581	16	70	70	7,322	257

Table 6

EMPLOYMENT BY ACTIVITY AND SEX
RUHIA 1976

Activity	Employed		Underemployed		In Training		Total	
	Male	Female	Male	Female	Male	Female	Male	Female
Construction	100	-	40	-	1	-	141	-
Forestry	250	-	400	-	-	-	650	-
Agriculture	2,500	-	400	-	-	-	2,900	-
Mechanics	8	-	3	-	5	-	16	-
Baking	4	-	-	-	-	-	4	-
Carpet Weaving	-	60	-	-	-	15	-	75
Commercial	70	-	-	-	-	-	70	-
Administration	407	5	2	3			409	8
Total	3,339	65	845	3	6	15	4,190	83

The following markets appear to operate on a regular schedule:

Monday	Makthar
Thursday	Siliana Sbiba (Kasserine Province)
Friday	Sbiba (Kasserine Province)
Saturday	Kessra Hababsa
Sunday	Ruhia

No data are available on the total value of goods sold or traded at these weekly markets.

In the study area, there are five identifiable sources of agricultural credit for specific projects. Two are banking institutions:

Banque Nationale de Tunisie (BNT)

Caisse Locale de Credit Mutuel (CLCM)

The next three sources are nonfinancial organizations, but they do provide credit "in kind."

Office des Cereales Tunisiens (OCT)

Office de Lakhmes

Office de l'Elevage et des Pasturages

All of these sources were contacted during the research conducted for this study and all indicated that they had little or no interest in "industrial" loans.

It appears that the only sources available to the industrialists are:

Commercial loans

Agence de Promotion des Investissements (API)

Fonds de Promotion et de Decentralisation Industrielle (FOPRODI)

Of the above three, FOPRODI is probably the one best suited to handle small and medium industrial enterprises. This organization was created under Article 45 of Bill 73.82 of December 31, 1973. It uses the financial resources of four banks:

Banque Nacionale de Tunisie

Banque du Sud

Societe Tunisienne de Banque

L'Union Internationale des Banques

Between the years 1975 and 1976, they have issued 57 loans for a total of 4.7 million dinars which, according to their records, have created 1,577 new jobs or an average of 2,980 dinars per job (about US$7,152 per job). The 57 new enterprises, according to these data, average 27.6 jobs per new enterprise. None of the new enterprises were in the project area; as a point of interest, about one third were in the environs of Tunis. This information was gathered from personal interviews with FOPRODI staff, as indicated in Appendix 1 of this study.

Infrastructure Summary

Only four infrastructure factors were looked into as basic for any industrial activity, even at the small-scale rural level. The factors investigated were: water, energy, transportation, and roads.

Water. In the Social Summary, it was pointed out that in many of the rural areas, there is a shortage of potable water and that most of the water has to be hauled to the homes, all of which requires a great deal of time and effort.

Map 3 delineates the seven natural basins of the project area and their respective rivers, creeks, and bodies of water, as well as the established earth dams. According to the data gathered on site, the project area has a natural flow of 1.4 million cubic meters per year of water going through the different dams.

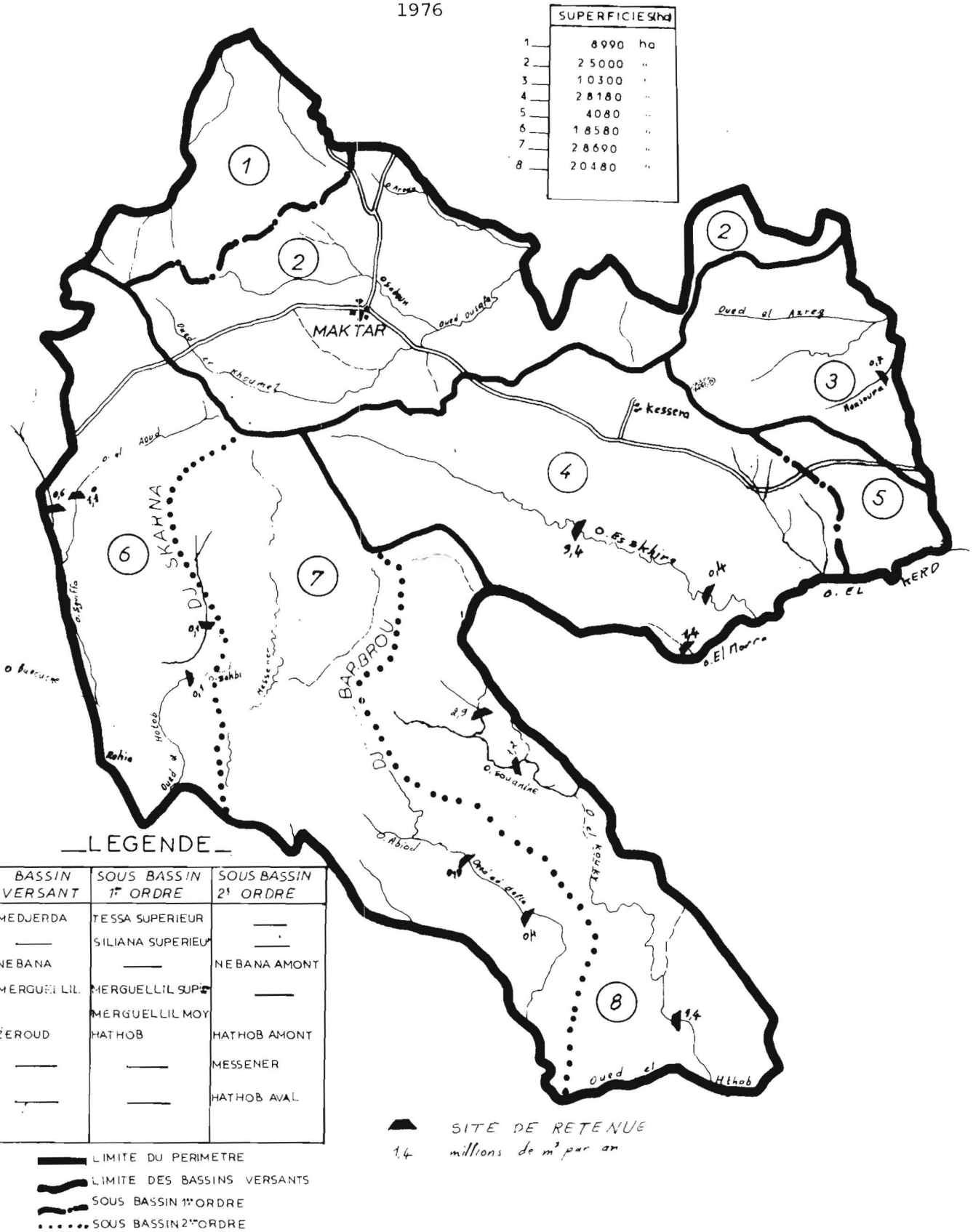
Map 4 presents the public water points of the project area; these are wells in existence or being built at this time. This information was obtained from Mr. Mogaadi at the Ministry of Agriculture (see Appendix 1 for details of the interview). Detailed information on each of the water points in the project area is presented in Appendix 3 of this study.

After several meetings with SODENE, diagrams of the water distribution systems for the communities of Makthar and Ruhia were obtained. They are presented as Figures 1 and 2, respectively.

From the interviews, maps, and information gathered, it is believed that an ample supply of water is available. However, the line of Djedeliane in the Ruhia distribution is kept open at all times, causing the pressure to drop in the system; consequently, little water gets to the 50-cubic meter tank at Ruhia. Makthar does not appear to have a water problem and its system capacity is sufficient to support small rural industries.

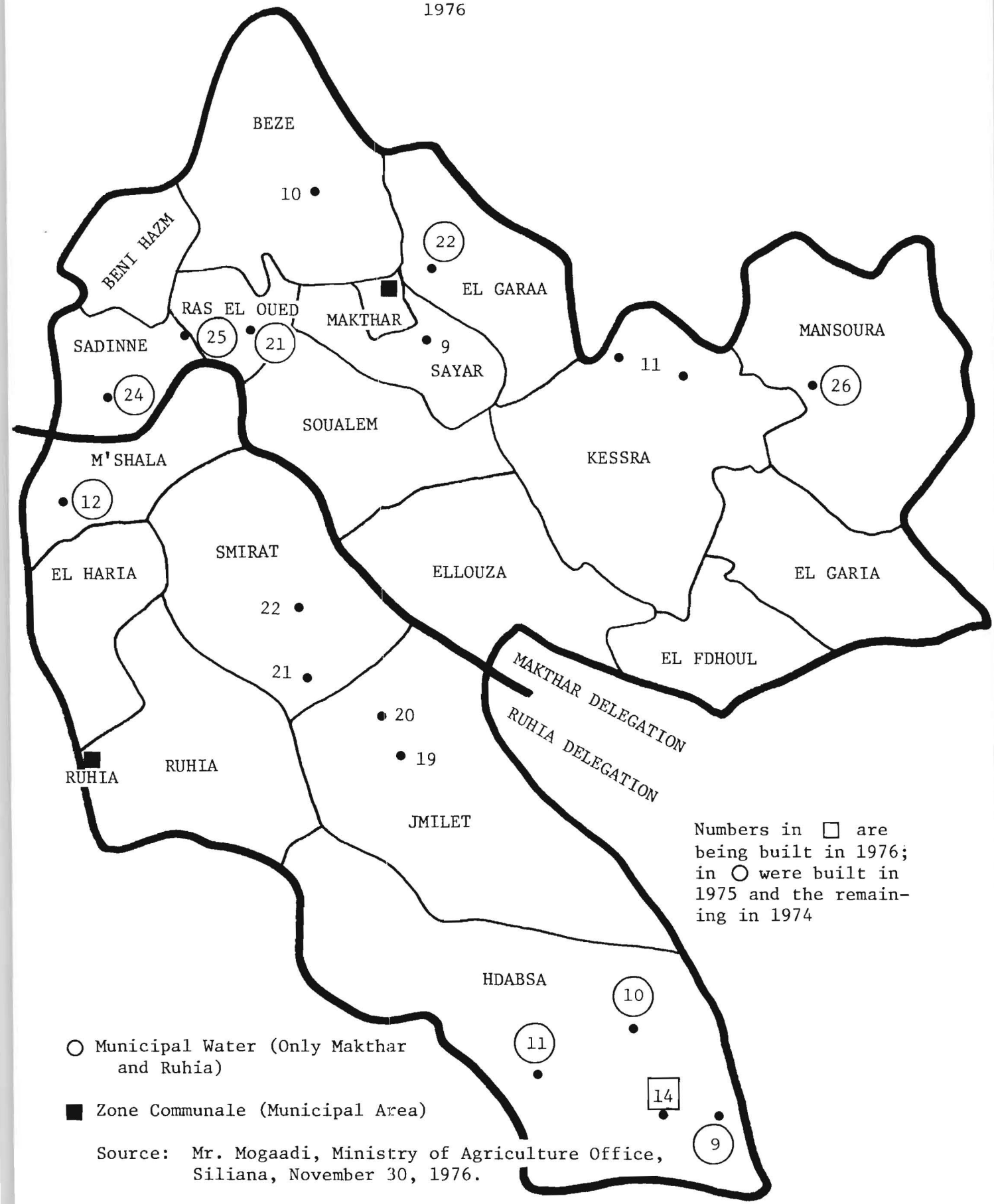
Map 3

RIVER BASINS AND DAMS
MAKTHAR AND RUHIA DELEGATIONS
1976



Map 4

PUBLIC WATER POINTS
MAKTHAR AND RUHIA DELEGATIONS
1976



Source: Mr. Mogaadi, Ministry of Agriculture Office, Siliana, November 30, 1976.

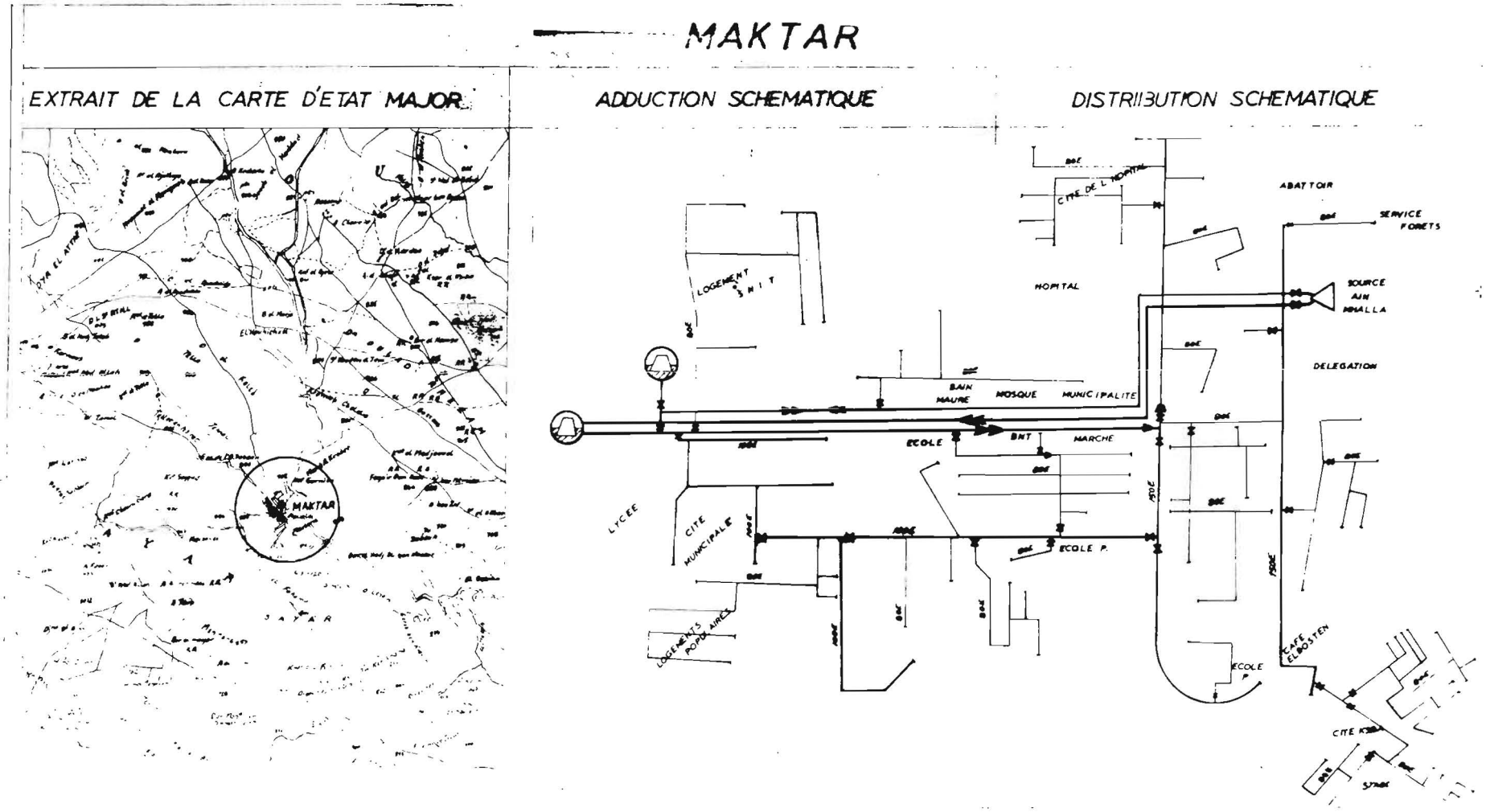


FIGURE 1: WATER DISTRIBUTION SYSTEM - MAKTHAR

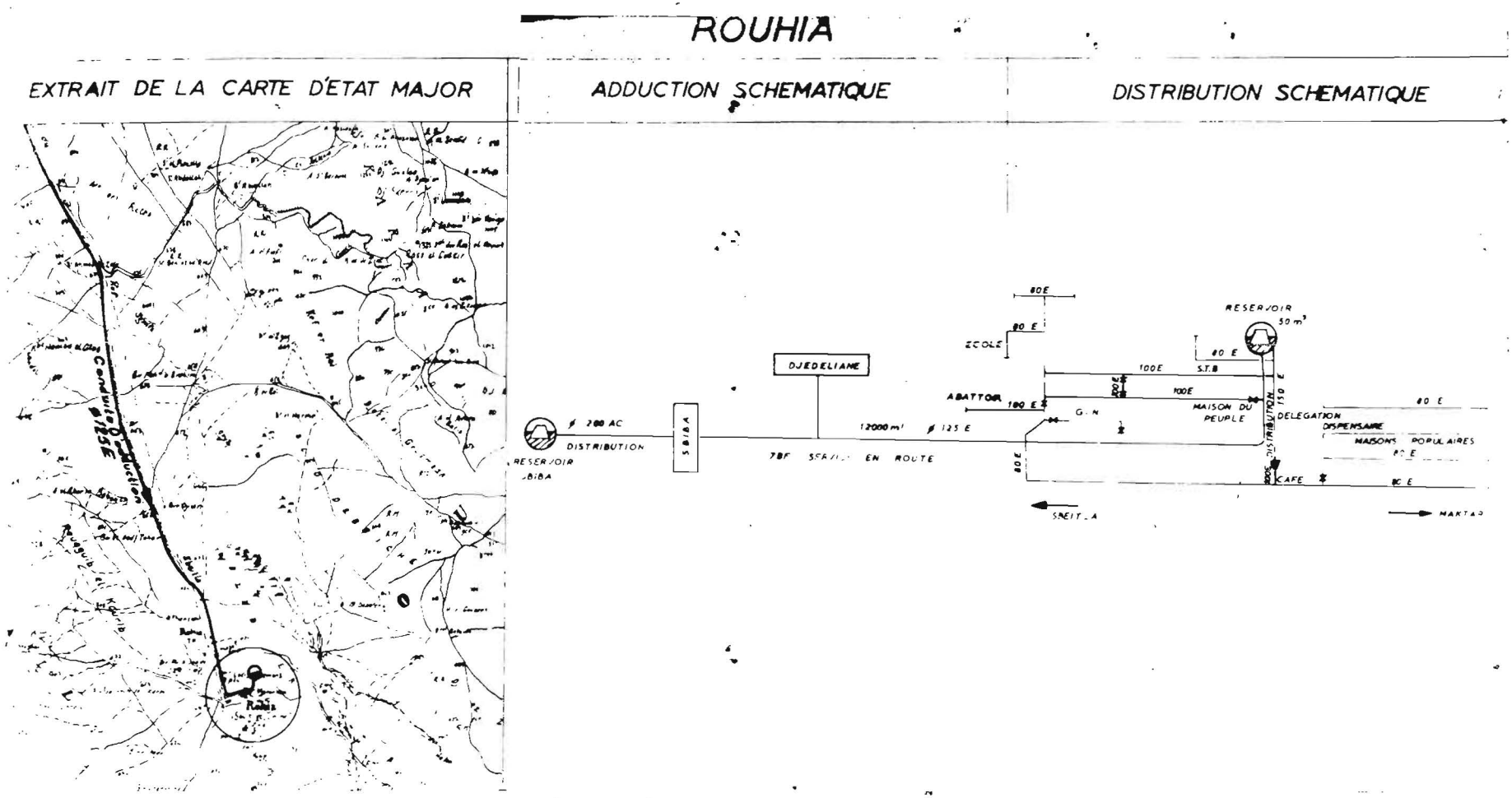


FIGURE 2: WATER DISTRIBUTION SYSTEM - RUHIA

Energy. The area, in general, is a low consumer of fuel since most of the agricultural activities utilize animal power. There are gasoline stations in both Makthar and Ruhia. Kerosene is often used for lighting, as well as candles. Some charcoal is available, but many use dry cactus as fuel for cooking.

The STEG provides the electrical energy coming into the project area. Both Makthar and Ruhia have electric power. (Maps 5 and 6 show the electric grid for the Makthar and Ruhia delegations, respectively.) The STEG office indicated that only about 10% of the households in the project area are users of the electrical service offered.

Transportation. Most of the transportation is routed through Makthar. There are three scheduled buses per day between Makthar and Tunis; the fare is about 850 millimes. Service also is provided to Ruhia, Kairouan, and Sousse.

A private car is available on demand to go from Makthar to Tunis. It costs about one dinar.

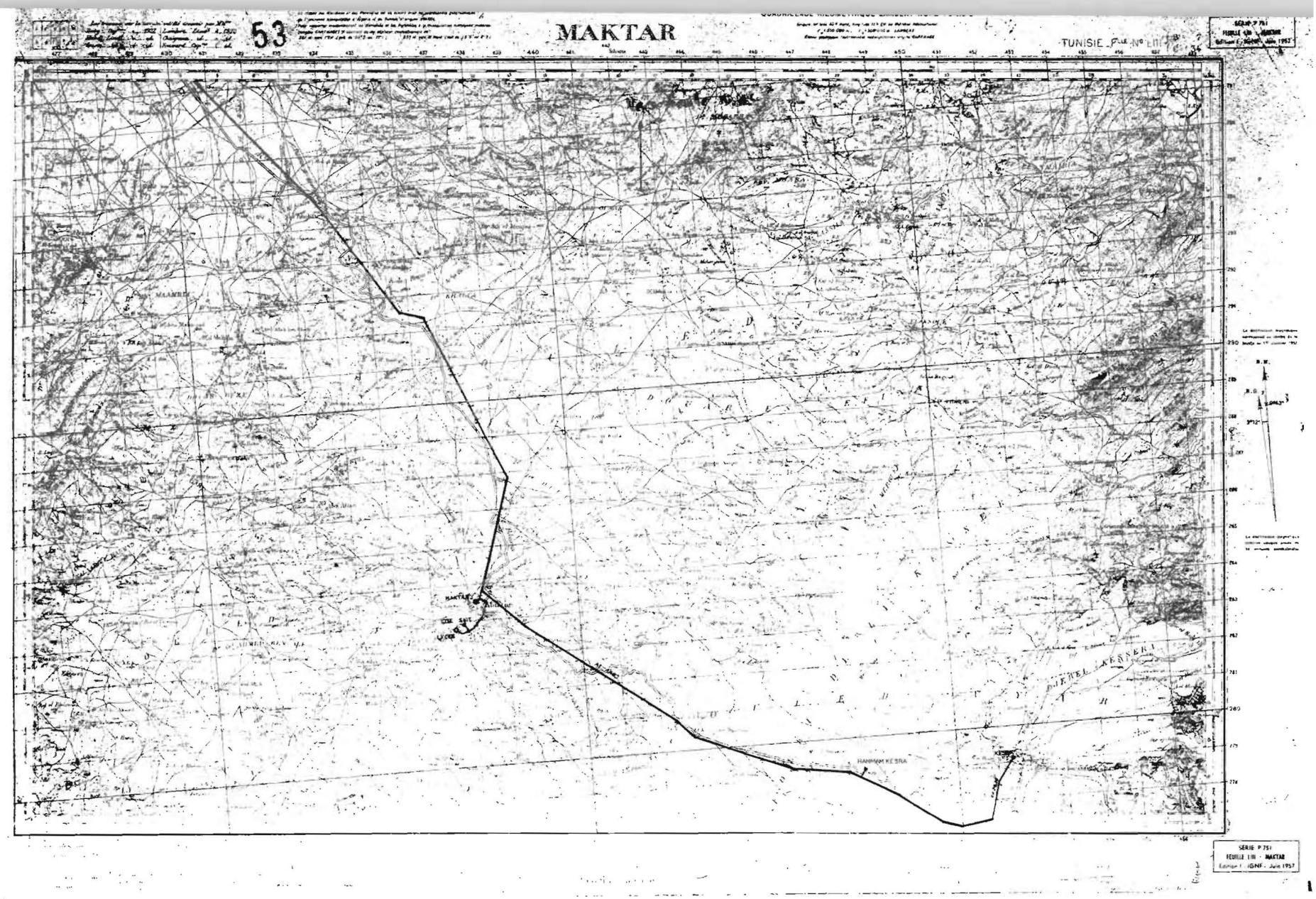
The SRTK office has bus, truck, and taxi services for the region. They operate through 15 agents. Their company has 54 trucks, 24 other powered vehicles, and 12 hauled vehicles. The rate for a 10-ton truck from Makthar to Tunis is 60 dinars per day (which also includes the nine hours of driver service).

Bus service is also available to Kef, Sers, Kairouan, Elba, Ksour, and Ruhia. Taxis are available for the Makthar to Tunis run, and they charge about 20% more than regular bus fare. These interurban taxis, called "louages," will take six or eight passengers per trip.

Also available are the "lignes marches," or special market-day buses. These, of course, are geared to serve the different market days throughout the area.

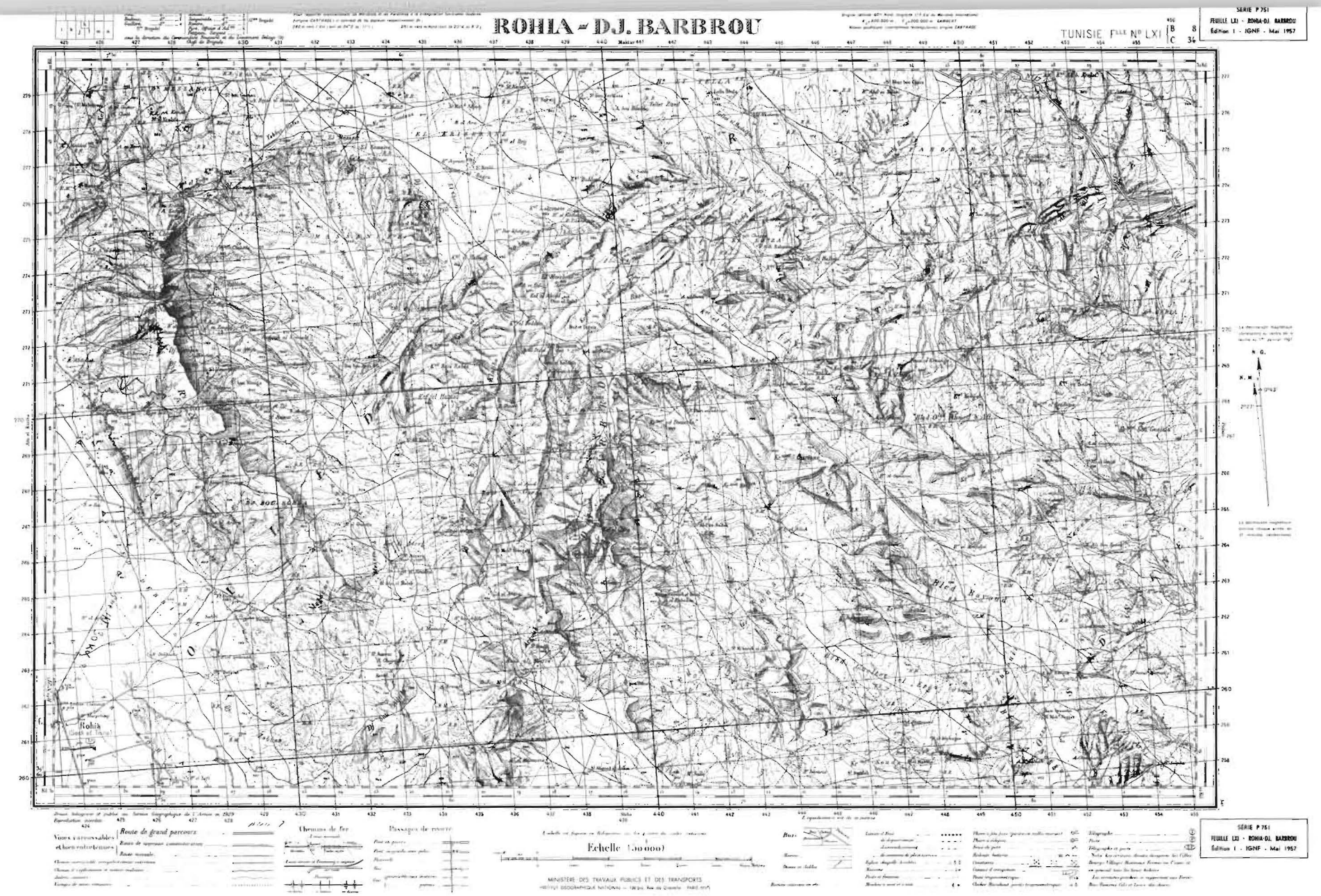
Animal transport is still the main means of locomotion, and some farmers (the better off) use their tractors as passenger vehicles.

Roads. Not too many roads are paved in the project area. GP.12 enters the Makthar area and extends on to Kessra and Kairouan. GP.4 also is paved, as well as MC.71. The MC.77 road is unpaved and badly eroded. Map 7 gives a general overview of the road network within the project area and Table 7 summarizes the present situation.



Map 5

ELECTRIC GRID FOR MAKTHAR DELEGATION



Map 6

ELECTRIC GRID FOR RUHIA DELEGATION

Map 7

HIGHWAYS AND ROADS
MAKTHAR AND RUHIA DELEGATIONS
1976

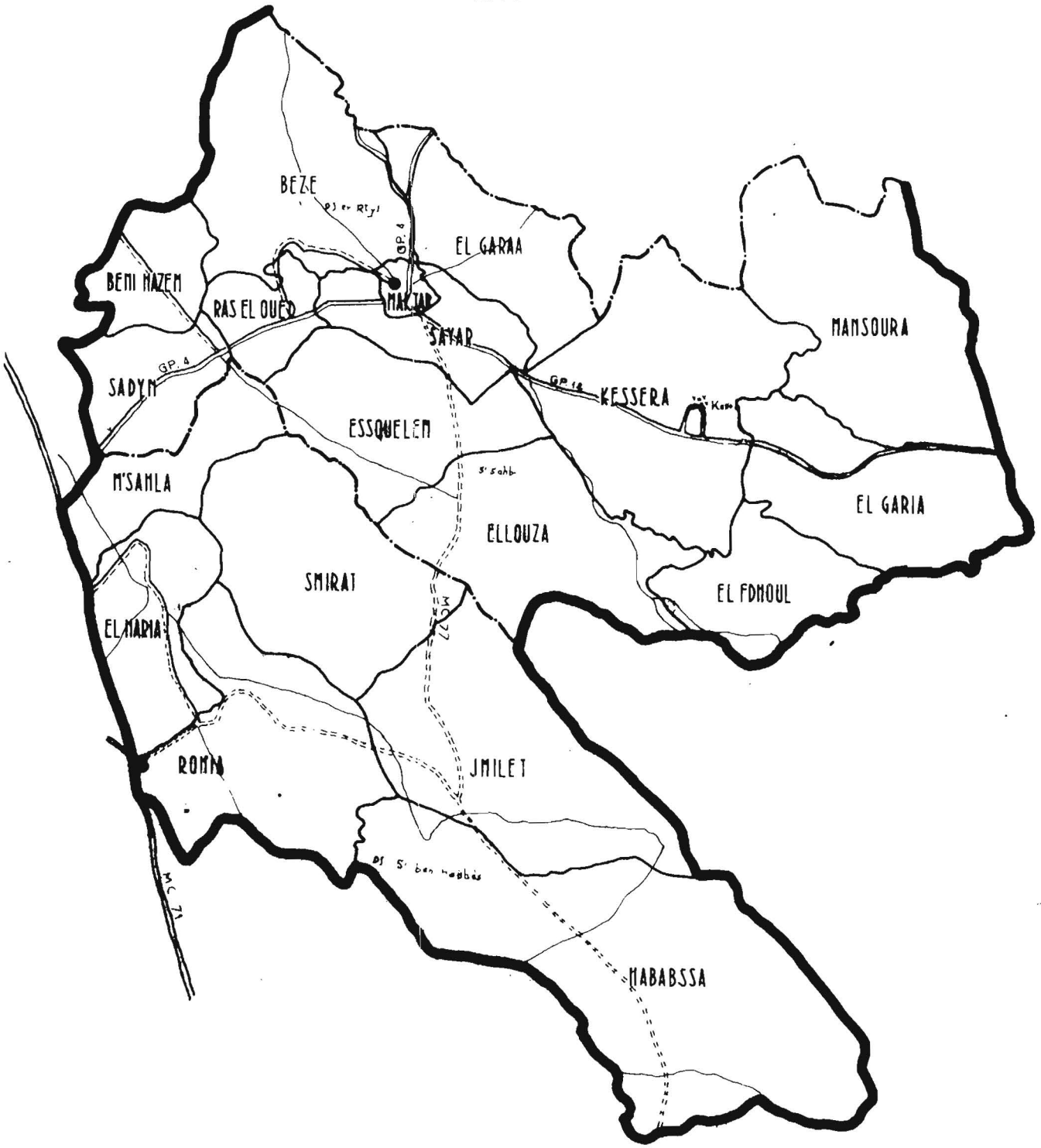


Table 7

PAVED AND UNPAVED ROADS
MAKTHAR AND RUHIA DELEGATIONS
1976

Type of Road	Number	From	To	Length (Km)
Makthar Delegation				
Asphalt	GP.4	Makthar	Souk el Djemaa	5
Asphalt	GP.4 C.71	Siliana	Ruhia	30
Asphalt	P.3 P.12	Kairouan	Le Kef	44.8
Asphalt	P.12	Makthar	Kessra	2.5
Gravel		Kessra	El Ala	2
Under Constr.	GP.4		Beni-Hazem	8
Planned	GP.4		Kessra	3
Trails		Various	Various	300
Ruhia Delegation				
Asphalt	C.71	Le Kef	Ruhia	70
Under Constr.		Ruhia	El Heria	16
Trails		Various	Various	250

Source: Interview with the Gouvernorat de Siliana on November 25, 1976.

PROJECT ANALYSIS

The government of the Republic of Tunisia, in cooperation with the Agency for International Development (AID), has developed an integrated Rural Development Project in Tunisia which is presently being implemented. This project is focused mainly on: (a) the agricultural-forestry activities of the region, (b) the development of the necessary infrastructure (roads and others), and (c) the improvement of educational and cultural facilities. This three-level approach is, in effect, an integrated rural development program.

To further integrate this development program, the sponsors are now considering the addition of a project focused on the development of small-scale rural enterprises and other agro-industrial activities.

Having completed the overview of the project area and having identified both the constraints and the potentials, this report now will review four major areas of activity that might well be integrated into the present rural development program.

Small Industry Potential

For all practical purposes, it may be said that the project area has little or no industrial activity. The research conducted on site revealed the existence of 24 small shops in the towns of Makthar and Ruhia. From Tables 5 and 6, it can be seen that if the agricultural employment is discounted, the employment in all other activities is minimal.

The small-scale industry concept is entering its most promising and complex phase as it becomes globally recognized. This study will attempt to assist the sponsor in identifying suitable small-scale industrial activities that may create productive complementaries within the project area, achieve some rural-urban balance and improve the economic conditions of the target group. The potential activities that will be presented must be researched further before they are to be implemented; appropriate prefeasibility and feasibility studies must be conducted to assure the success of these small enterprises.

A. Service Park in Makthar. During the on-site period of research, it became apparent to the staff that in Makthar the few existing small-scale industry activities--five carpenter shops, four automotive-mechanic shops, one

electrical repair shop, and one blacksmith--are all located in the center of the town. As an example, the repair shop of Mr. Rachio Ben Touhami (for details, please refer to Appendix 2, Interview No. 6) is located one street above the central marketplace with an available working area of about 30 square meters, but all work is done outside on the street because he has no electric light. At present, Mr. Touhami is planning to move his shop to a new building under construction on the main street of Makthar, two blocks north of the central market and across the street from the elementary school. This also is a very undesirable location for this type of activity, and he would be interested in moving to a service park, if one were in existence.

The Mohamed Barni carpenter shop at Rue Belahoune (see Interview No. 8, Appendix 2) is a similar case in Makthar. The business is housed in a 12-square meter area where a multipurpose saw, drill, and other tools are installed, as well as the small stock of raw material. In a conversation with Mr. Barni, he indicated that the operation should be housed in an area of about 200 square meters plus an additional storage area of about 20 square meters.

Makthar, much like other towns in Tunisia, has a "plan d'amenagement," which is similar to an urban master plan, but these plans usually are not kept up to date (see interviews of January 20, January 24, and January 26, 1977, and others in Appendix 1). The plans for Makthar and Ruhia, which appear in Appendix 4 of this report, are outdated and incomplete.

In general, it may be said that the small-scale enterprises of Makthar currently face one or more of the following problems:

1. Inappropriate or unsafe location.
2. Insufficient or inadequate working and storage area.
3. Other available locations are outside the plan d'amenagement.

Based on the above analysis, it is suggested that consideration be given to the establishment of a small "service park" in the town of Makthar. Two basic options are available in the establishment of the service park:

1. Build a totally new facility.
2. Refurbish an existing facility.

If the decision were to build a new facility to house a few of the existing small-scale enterprises, the design would be no different from the one used in the second option. Several inexpensive rooms would be housed in one

warehouse-type structure, all with outside entrances and independent of each other. Each small industry would then rent, lease, or buy one or more of these units for its enterprise.

The main advantages of a new facility would be higher quality construction, more flexible and better space utilization, and allowance for expansion. Building maintenance needs would be lower, and better services could be installed.

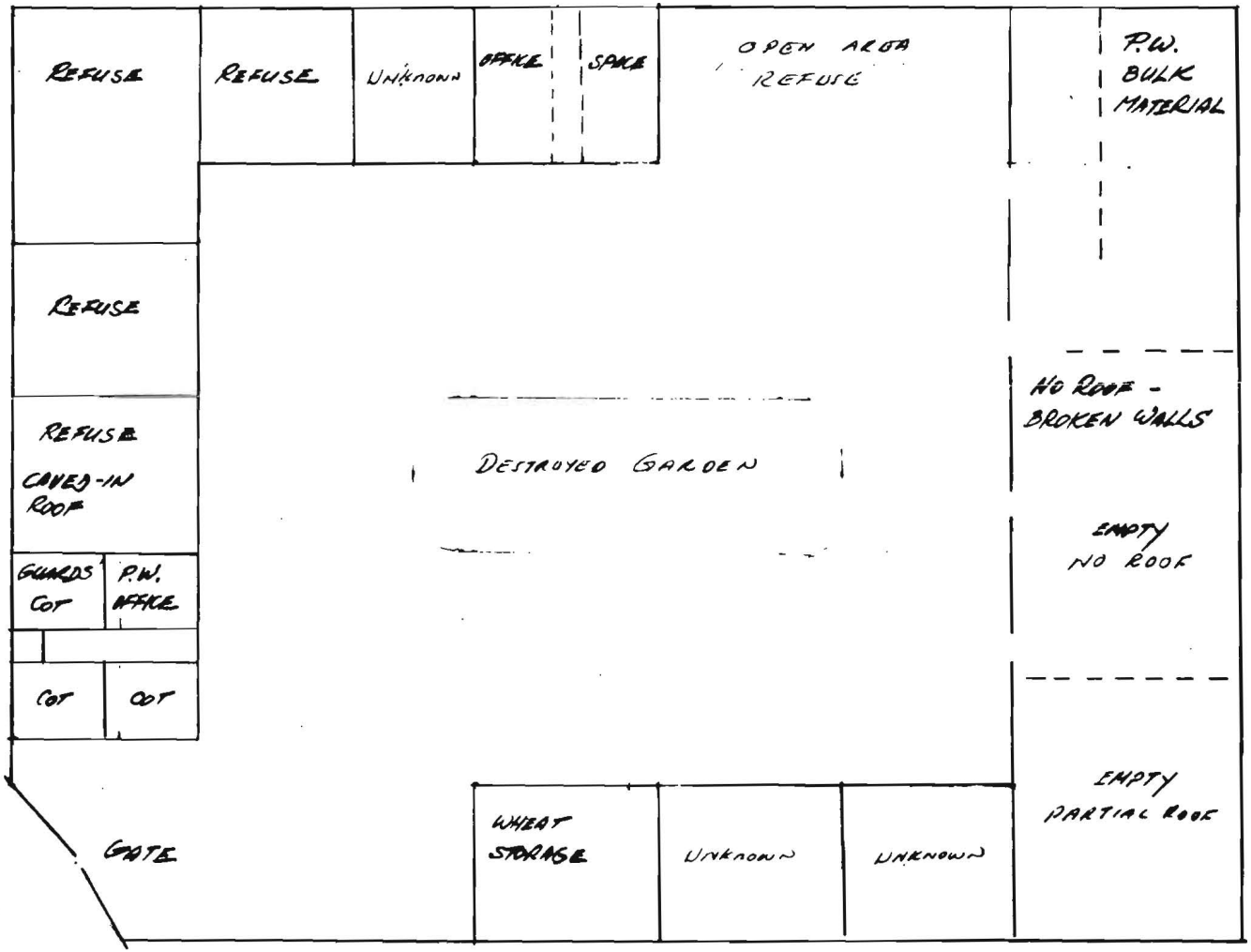
If the project sponsors decide to use and refurbish an existing installation, it is recommended that they consider the presently abandoned Ministere de l'Equippement installation about one kilometer to the east of Makthar, near the soccer field. This installation has been vacant since the Public Works office moved to Le Kef two years ago. The compound has a grain storage bay, sleeping area, and several empty buildings (bays) which have lost their roofs and doors, and badly need repair.

At a meeting with Mr. Saadi of the Ministere de l'Equippement (ME) on January 25, 1977, he indicated that they would like to retain about one third of the existing facilities and that the Office des Cereales (OCT) requires another one third (southeast corner, five bays). Mr. Saadi further indicated that he would be in favor of releasing the balance of the buildings to the project if they were to be used in the establishment of a small service park for Makthar. He further suggested that a formal request be made to Mr. Abdelmajid Chatti, as he is the Delegate of Makthar. The area suggested for the service park would be compatible with the present plan d'amenagement and has been verbally accepted by several local officials, including Mr. Chatti, and the potential users.

Renovation of the existing facilities would cost less than building a new structure; in addition, part of the complex could be used immediately and the balance could be refurbished in less time than that required to build a new structure. Five or six support-type activities could be relocated at the service park, all of which are now operating in Makthar. One suggested industrial mix would be automotive mechanic, electrical repair shop, blacksmith, plumber, and machine shop.

Figure 3 presents a sketch of the present installation as well as current usage and conditions of the bays. Figure 4 offers a sketch of how the buildings could be distributed to satisfy both the ME and the OCT while still

PUBLIC WORKS COMPOUND IN MAKTHAR
PRESENT INSTALLATION
(Approximation, not-to-scale)



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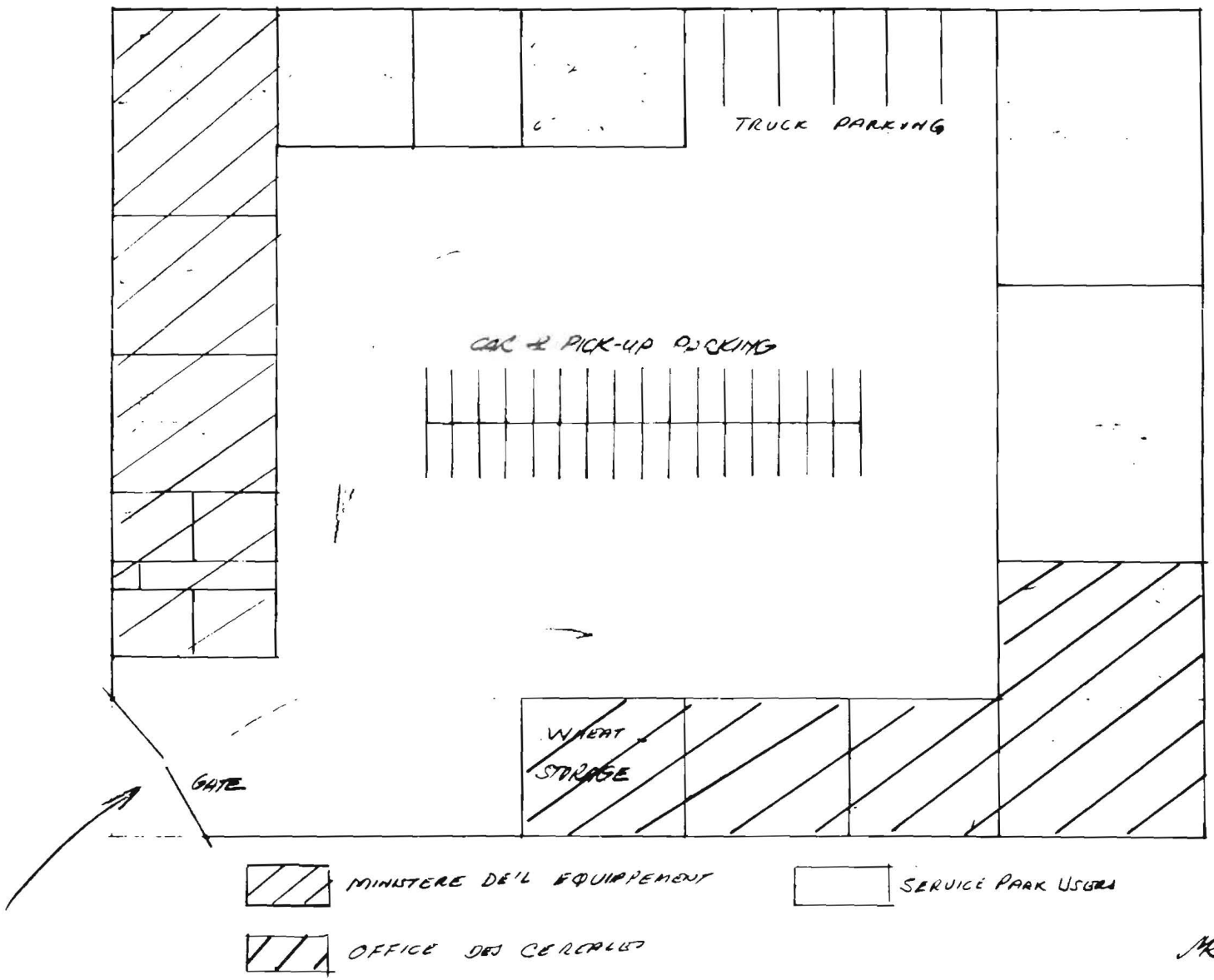
SUGGESTED SERVICE PARK
REBUILT PUBLIC WORKS COMPOUND IN MAKTHAR
(Conceptual, not-to-scale)



MR Dec. 1976

having some available area for the proposed service park. Figure 5 shows the area reserved by the Ministere de l'Equippement, Figure 6 the area reserved by the OCT, and Figure 7 the area to be refurbished for the service park users.

B. Brick Plant. Some time in 1969, a brick-making plant was established on or about Km 2 of the Makthar to Siliana paved road (P.4). The plant was closed about two years later and, according to the interviews conducted on this subject, its reasons for closing were not economic. The buildings are still usable, but need some repairs, and a power line is located less than 100 meters away. In addition, the plant still has most of the equipment--pugmill, extruder, cutters, and others--plus a diesel engine. All the equipment needs to be cleaned, adjusted, and repaired. Figures 8 and 9 show part of the existing building and one of the two demolished kilns.

Both kilns also need to be rebuilt if the plant is to be reactivated. According to the UTICA office in Siliana, the reactivation of this industry would require an investment of 600,000 dinars. When in operation, the plant would employ about 150 persons, resulting in capital costs of about 4,000 dinars per job created. This appears to be a high estimate, but not enough time was available to verify the UTICA figures. The plant would be able to produce about 45,000 metric tons per year, which would all be used locally since, at present, bricks are imported from other areas of Tunisia into the project region.

As pointed out in the interview held on January 25, 1977, with the Service de Batiments, there are plans for a new brick factory to produce 60 tons per day at an initial cost of about 800,000 dinars. The investors should consider rehabilitating the existing facility, and a cost/benefit analysis should be conducted to determine which is the more feasible option.

Whichever of the options is proven better, there still remains the basic concept that the establishment of a brick-making plant in the project area appears to be feasible and highly desirable.

C. Other Industrial Activities. Several other industrial activities appear to be possible in the area, but these "concepts" would require additional research and the preparation of preinvestment studies or, as they are often called, manufacturing opportunity studies. The possibilities detected from the research conducted are as follows:

Lime. The product is locally referred to as "chaux artificielle," which is the caustic infusible solid usually obtained by calcining limestone,

FIGURE 5: BUILDINGS RESERVED FOR THE MINISTERE DE L'EQUIPPEMENT

FIGURE 6: AREA RESERVED FOR THE OFFICE DES CEREALES

FIGURE 7: ABANDONED BUILDINGS TO BE REFURBISHED FOR SERVICE PARK

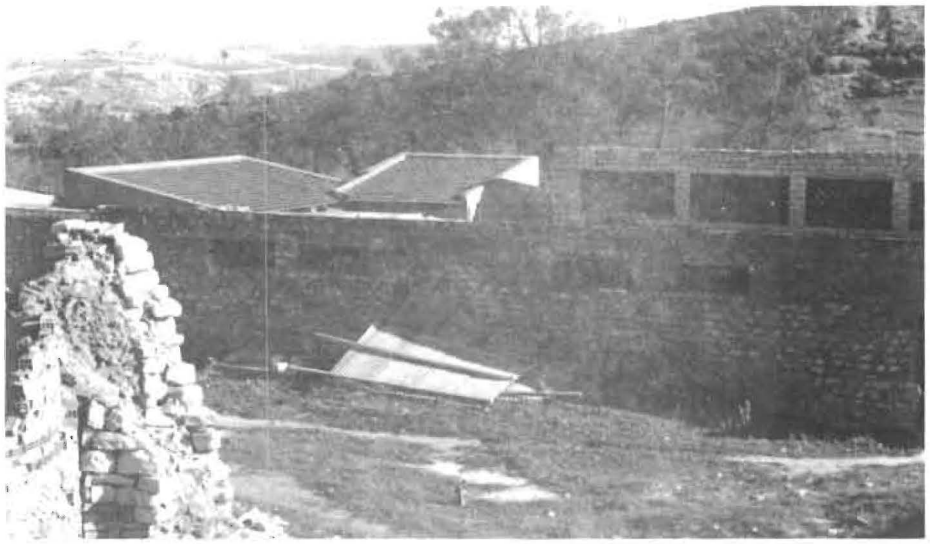


FIGURE 8: OLD BRICK-MAKING PLANT, MAKTHAR-SILIANA ROAD

FIGURE 9: DEMOLISHED BRICK KILN

shells, or other forms of calcium carbonate. In English the product is usually referred to as quicklime, burnt lime, or caustic lime. From the field data, there appears to be a deposit in the Kessra sector, but no testing has been done to determine if it is of industrial value. The UTICA office in Siliana indicated that about 60,000 metric tons of lime are imported into the area every year.

Minerals. During a field trip to the Ruhia delegation on November 12, 1976, a local mineral deposit was discussed and three samples were given to the field staff. The samples were later taken to the Engineering Experiment Station at Georgia Tech and X-ray diffractograms were performed. The results are shown in Figure 10. From the X-ray diffractograms, the following information was determined:

Sample A. Predominantly iron oxides (hemalite, goethite, and amorphous iron oxides). The impurities are mainly calcite.

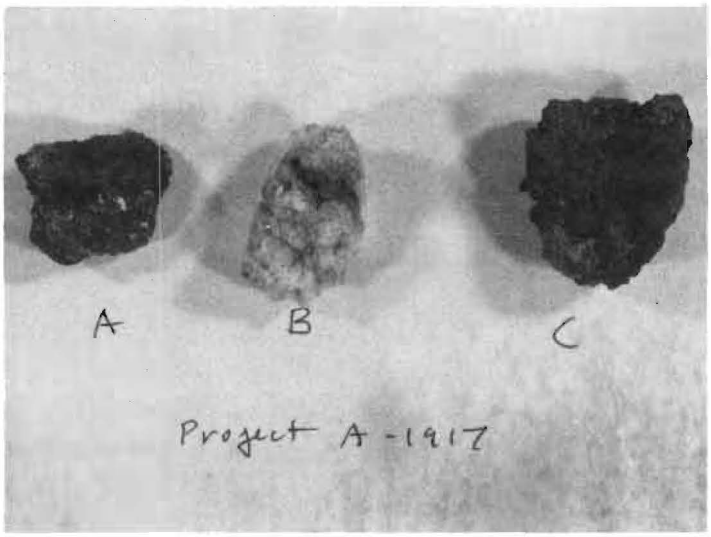
Sample B. Predominantly white, crystalline quartzite, with minor impurities of quartz and montmorillonite.

Sample C. Predominantly red iron oxides, with small incrustations of calcite.

The industrial uses of these types of ores are several, but any recommendations would depend on determination of the size of the deposits. Assuming that the samples are parts of deposits of sufficiently large size, then they could be used industrially for the following:

1. Manufacture of steel. The necessary constituents for steel making are iron ore, limestone (in pure form about 98% calcite), and coal. If coal is available in Tunisia in the necessary quantities and degree of purity, and if the samples are representative of the grade available at the deposit, and if the deposits are sufficiently large, then steel making may be considered.
2. Manufacture of industrial pigments. Again, if the quantity and quality are there, these ores could be used to manufacture high-purity, very fine iron oxide reds and whiting (this from the calcite).

Tiles. The raw material is in evidence in the area in the form of various grades of limestone running from brittle to hard. The stone can be



APPROXIMATE MINERAL COMPOSITION BY X-RAY DIFFRACTION

A.	Iron oxides (hematite, goethite and amourphous iron oxides)	90%
	Calcite	10%
B.	Calcite	99%
	Other (possibly montmorillonite and quartz)	1%
C.	Iron oxides (hematite, goethite and amorphous iron oxides)	90%
	Calcite	8%
	Other	2%

FIGURE 10: RESULTS OF TESTS, MINERAL SAMPLES, DELEGATION OF RUHIA

sawed and formed as desired. At present, the material is used by the school in Makthar for students interested in stone carving, sculpture, and related activities. The UTICA office indicated that the project area market consumes about 120,000 metric tons of tiles per year. It would be of interest to survey the local limestone quarries, systematically test the materials available, determine the stone reserves at present, and prepare a manufacturing opportunity study on this product.

Agro-Industrial Potential

The Rural Development Project presently being implemented has, without doubt, researched the agricultural activities to a high degree, and the USAID Mission to Tunisia currently has a full-time agronomist, Mr. Rudy Vigil, assigned to this project. This study, therefore, will limit itself to suggesting agro-industrial activities that appear to be desirable and that may well fit into the overall plan for the rural development of the project area. The ideas presented in this section are just that--ideas; they need to be further researched and studied in view of the well-programmed agricultural projects being now considered or being implemented by the sponsor.

A. Apiculture. Beekeeping (apiculture) is a very traditional agro-industrial activity within the project area. According to the field data gathered in 1975 (see Agricultural Summary), there were 135 apiculturists operating 2,030 traditional hives and 43 modern hives to produce 10,257 kilograms of honey in that year. This production from the project area is appreciable, but may well be on the low side. From statistical data available at EDL in Atlanta, and from consultation with Mr. Harvey Diamond of the EDL staff, it was determined that in 1972 about 197 million pounds of honey were produced in the U.S.A. with 4.07 million hives, or an average of 48 pounds per hive. The established production of 10,257 kilograms or 22,565 pounds from 2,073 hives in the project area yields an average production of 10.8 pounds per hive, or about 25% of the standard U.S.A. volume.

Since this is such a traditional activity in the project area, the agricultural team should consider assisting the apiculturists in the area to improve their procedures in order to increase annual production to 20 pounds per hive. From general observation in the field, it appears that part of the problem lies in the actual harvesting of the honey, which is inefficient, employing natural combs and very crude procedures to lift the combs from the

fixed mud covers. The extraction of honey is done, in most cases, by hand, i.e., hand wringing of the combs.

If the apicultural practices were improved, this could lead to another small-scale rural industrial possibility for the area--manufacturing beekeeping supplies. Figure 11 is representative of a typical 10-frame beehive manufactured by a small-scale rural enterprise.

A natural extension of this concept is to consider the honey processing aspects of the business. At present, the beekeeper receives about 1,600 millimes (about US$3.70) per kilogram of honey, but this product retails at twice that once it is packaged in a modest plastic container. A small-scale processing operation could easily be set up, utilizing a simple, hand-operated clarification process (centrifuge) developed by CIDERE Bio Bio in Chile.[1/] By broadening his activities to include processing, a beekeeper could greatly increase his income from the same volume of honey.

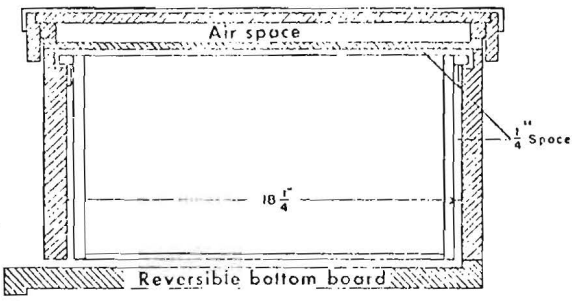
B. Olive Oil. According to the Rapport General of the often-mentioned Projet de Developpement Rural Integre du Sud du Gouvernorat de Siliana (page 12) in 1976 about 8,200 hectares in the project region were covered with trees; 66% of this area was in olive trees (about 447,500 trees). The Tunisian-Dutch study also previously mentioned indicated (page 36) that an average olive tree produces 20 kilograms of olives per crop; assuming this is correct, the actual olive crop for the area is about 8.9 million kilograms or 8,900 metric tons per year.

Significant value could be added to this portion of the national olive crop by establishing packing houses for raw olives either for the export trade or for local consumption. The second obvious approach is to convert olives into olive oil through a pressing process. Several such small plants are in operation in the area (see Appendix 1, Thursday, November 18, Ben Amer), but not many producers have the capital or entrepreneurship to enter this activity. The agricultural experts may wish to consider the possibilities of using a simple appropriate technology approach and developing a mobile press and tank vehicle to tour the production area during harvest time.

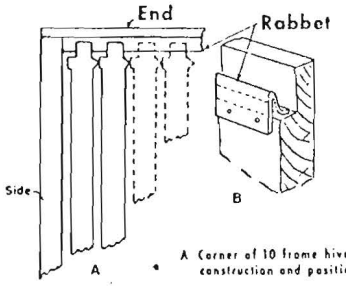
[1/] Nelson C. Wall, Chile-Intermediate Rural Technology Project, Economic Development Laboratory, Georgia Institute of Technology, Atlanta, Georgia, October 1976.

FIGURE 11

PLANS AND DIMENSIONS FOR A TEN-FRAME BEEHIVE

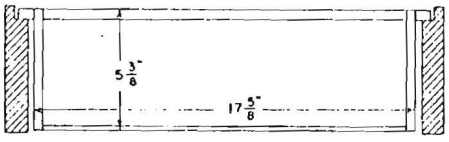


CROSS SECTION OF HIVE BODY AND FRAME

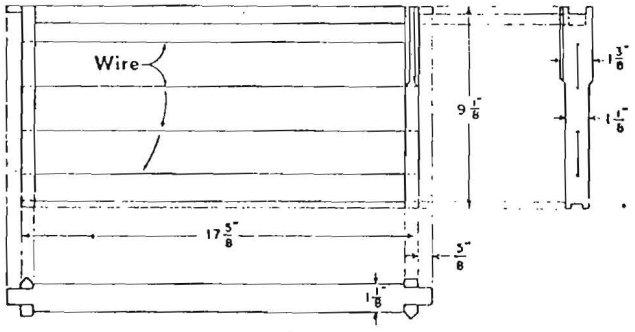


A Corner of 10 frame hive body, showing construction and position of frames

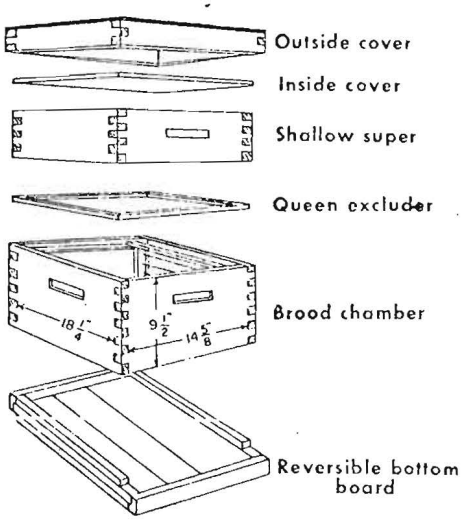
B. Part of end of hive body, showing rabbet, which should be made of tin or galvanized iron



CROSS SECTION OF SHALLOW SUPER



SIDE, END, AND TOP ELEVATION OF FRAME



Several similar engineering concepts have been developed over the years as a solution to agricultural production bottlenecks.[1/] Many have proven to be feasible and, in some cases, highly productive.

C. Almonds. Data obtained through the agriculture office (CRDA) in Siliana indicate that there are some 110,000 almond trees in the project area which produce about 10 kilograms of almonds per year per tree for a total rounded production of some 101 million kilograms of almonds. These almonds are usually sold green and unshelled for about 200 to 250 millimes per kilogram. The crop, therefore, is worth about 200,000 dinars.

An enterprising farmer could increase his income significantly by simply allowing the almonds to dry and then shelling the nut before selling his crop. A local entrepreneur could go one step further, if desired, and roast and package the nuts.

D. Wool Processing. The field interviewer indicate that nearly all of the wool yarn used in the existing carpet industry and in the knitting schools is imported from somewhere else in the country or from the outside world. It was also determined that nearly all of the wool production from the project area is sold raw to dealers to be washed, carded, dyed, spun, and brought back (re-imported) to the area.

In meetings with the Delegate of Makthar (see Appendix 1, various entries), he indicated that he has a preliminary study for a wool processing plant in Kessra and that he has discussed this with the Omda of Kessra. The project would create 40 new jobs (mostly female) to wash, card, dye, and spin some 8,000 kilograms of wool over a six-month cycle of operation.

The main limiting factor appears to be the lack of water in Kessra. From the on-site inspection, it was determined that some water is available, but it is a public water point open to humans and animals alike. It would be desirable to improve the present facility and, in so doing, accomplish two things:

1. Improve the health of the population.
2. Provide the necessary water for a small industry activity.

[1/] Ross W. Hammond, Employment Generation Through the Stimulation of Small-Scale Industry, Pictorial Monograph No. 1 - Selected Aspects of Intermediate Technology, Economic Development Laboratory, Georgia Institute of Technology, Atlanta, Georgia, January 1976.

The same activity also could be considered for Ruhia, where again the raw wool is available, but there is a shortage of water. The water shortage at Ruhia can be resolved by either using better water management techniques (i.e., closing off the line to Djedeliane a few hours per day to allow the water pressure to fill up the Ruhia tank) or by installing a pumping station on the distribution system.

The agricultural staff assigned to the project may wish to request the assistance of other persons with engineering, design, and appropriate technology backgrounds to assist them in developing some of these small industries.

Tourist Potential

The interviews held with both the representatives of the SHTT, Office du Tourisme, and Tourafric (Appendix 1, January 21, 1977) were instrumental in generating the idea for another nontraditional small-scale enterprise in the project area--tourism.

Tourist tours could be developed to promote visits to Makthar; the question is what is there to see? The following attractions are in existence:

1. Mactaris Roman ruins
2. Mactaris museum
3. Punic Tower (on road to Hbabsa)
4. Municipal park (presently in shambles across from the museum)
5. Artisan schools (carpet weaving, stone cutting, bird cage making, others)
6. Folklore
7. Technical school
8. Turkish bath

In Kessra can be found:

1. Roman ruins
2. Old town
3. Forestry station
4. Primitive beehives
5. Artisans

What then are the obvious needs to attract tourists?

1. Refreshment stand in Makthar, probably the old cafe across from the museum.

2. Acceptable eating place. The simplest solution would be to upgrade the Mactaris or the other restaurant at the central market.
3. Minimal (one-star) acceptance level of hotel accommodation. Either the Mahraba or the Mactaris could be upgraded.
4. Necessary support through tour guides, publications, and other means.

The following suggested tours were developed through personal interviews with different tourist agencies in Tunis and from previous experience as a traveler.

Potential Tour Circuit

One-Day Tour. The tour would start in Tunis, go by bus to Tuburbo and Majus, where there would be a stop at the Roman ruins. From Majus to Makthar. Lunch in Makthar, visit to Mactaris and the museum, return to Tunis in the afternoon. (Estimated price for the tour, 8 dinars, not including food or other services.)

Two-Day Tour. Starting from Tunis to Majus and then to Makthar for lunch and visit. In the afternoon, continue to Kessra for visit to ruins and return to overnight in Makthar. Following day, continue to Dougga and from there to Tunis.

Three-Day Tour. Starting from Tunis to Kairouan, overnighting in that city. Next day, continue to Kessra and Makthar, with overnight in Makthar. Third day, continue to Le Kef and Dougga, and then to Tunis.

The rural development program staff may wish to consider this option and look into the potential of bringing in tourism to the project area as a complement to the other activities.

Training/Development Potential

The often quoted and referenced Projet de Developpement Rural Integre du Sud du Gouvernorat de Siliana has incorporated a significant training component, but all programs are in the agricultural and social sectors. The publications available do not indicate any provision for training in the areas of economic development, appropriate technology, industrial extension services, and other more technical fields. It is possible that the concept that will be developed later in this section could be supported by institutions such as Union Tunisienne de l'Industrie, du Commerce, et de l'Artisanat; Centre Nationale

d'Etudes Industrielles; Centre d'Artisanat; Societe d'Etudes des Projets Industriels Tunisiens, and others, including the USAID Mission to Tunisia.

Tunisian Rural Technology Center (TRTC). The TRTC, as proposed here, would perform two much-needed functions in Tunisia:

1. Create a system capable of generating and/or adapting technologies, transferring them, and when needed, implementing these new concepts.
2. Create an in-house training facility that, after a few years, will be capable of producing technicians with a defined orientation toward solving rural technology problems, designing appropriate technology machines and equipment and, in general, providing much-needed technical support to the economic development of the project area.

The TRTC would have the following basic objectives:

1. To promote the development and dissemination of intermediate rural technologies appropriate to Tunisia, particularly in the areas of agriculture, rural development, and small-scale enterprise.
2. To identify, design, and adapt from existing designs appropriately scaled, labor-intensive technology and policies and institutions directly related to their use.
3. To assist in the formulation of policies and techniques which will facilitate the organization of new small rural enterprises.
4. To engage in the field testing of intermediate technologies.
5. To develop and train native personnel to conduct these activities and to provide industrial extension services to the small-scale industries of Tunisia.
6. To provide a delivery system which will link the existing world of knowledge to the present needs of the rural population in the area of appropriate technology.

Similar organizations are presently in existence in many less-developed countries (LDC) and many have proven to be highly successful. The University of the Philippines Institute for Small-Scale Industries (UP/ISSI) is an example of such an organization which is presently involved in a series of research activities with the Georgia Institute of Technology. Other AID-supported programs in the same area would include Instituto Nacional de Tecnologia (INTEC)

in Chile; Fundacao Educacional do Sul de Santa Catarina (FESSC), Brazil; Soong Jun University (SJU) in Korea and many others.

Once the TRTC is established, it could initiate an extension service type of operation in the rural areas of Tunisia. A primary target area could well be the project area of the Makthar and Ruhia delegations. Many possible approaches are feasible at this point, but for the purpose of this study, it suffices to indicate that these options could easily be developed at the request of the sponsor.

CONCLUSIONS AND RECOMMENDATIONS

Extensive field research and analysis have led to some conclusions and recommendations in reference to the present-day situation of the delegations of Makthar and Ruhia. One thing is obvious in this study: viable, reliable, current information on small-scale rural enterprises is, at best, scanty in Tunisia. Based on research conducted by the field staff and personal on-site experience, this study has presented (1) an overview of the project area and (2) analyses of four facets of the project; following are the conclusions and recommendations resulting from the study.

Assuming that the host country is determined to establish a program to develop rural small-scale enterprises, then the first order of business would be to clearly identify the existing constraints and develop the appropriate actions that will either ameliorate or eliminate them.

From the information and analysis developed in the course of this study, the following physical or human constraints are evident:

1. The project area has a dispersed and fairly isolated population. In the Makthar delegation, 55% of the population (22,331) is recorded as "dispersed," and in the Ruhia delegation, 73% of the population is so classified. (See Table 3.)

2. The area has a very limited amount of surfaced or paved roads. (See the Infrastructure Summary and Table 7.) There are only about 152 kilometers of paved roads in the total 704-kilometer network of roads that serve the project area. In other words, only about 21% of the total network is paved.

3. Few trained persons are available for productive activities. This is a result of the limited educational facilities that are available to the population. In the Social Summary it was established that there are 30 primary schools in the area; these schools have a student/teacher ratio of about 61 to 1, and the number of students qualified to pass the second-level entrance examination is quite low. Furthermore, no high school education currently is available in Ruhia, but there is a Lycee Technique Mixte at Makthar.

4. Traditional attitudes isolate women from many productive activities. Tables 5 and 6 of this study support this conclusion. Out of a total of 4,273 persons reported as employed, underemployed, or in training in the Ruhia delegation, only 83 were female (1.9%). In the Makthar delegation, out of 7,579 persons reported as employed, underemployed, or in training, 257 females were identified, or about 3.3% of the total. In the primary level of education, the reported population in attendance is about 70% male and 30% female.

5. Little indication exists of community mobilization or participation in "self-help" type activities. Supporting this conclusion are the following examples: In Appendix 1, an entry under January 25, 1977, contains a report on the Municipal Park at Makthar that is indicative of this attitude. In addition, during an interview with the Ministere de l'Economie Nationale on January 29, 1977, Mr. Baussoufa indicated that "solid waste disposal (i.e., garbage) is the worst pollution problem in Tunisia."

6. The area has heavily eroded soil with limited vegetation. This constraint affects the agro-industrial potential to a certain degree. The point is well defined in the Projet de Developpement Rural Integre du Sud du Gouvernorat de Siliana, Rapport General, page 3.

7. The water supply is undependable. This conclusion is more oriented to the town of Ruhia than to the balance of the project area. It has been determined through this study that this is a problem of poor water management. Either better operating procedures or the installation of a pumping station will resolve this problem.

8. There is limited social infrastructure in the areas of education, public health, and other services. These points are all highlighted in the Infrastructure Summary of this study.

After considering these many constraints, the obvious conclusion is that, at best, this is a difficult area in which to introduce a program for the development of small-scale rural enterprises.

There is no doubt that these constraints are limiting, but the most basic limitation appears to be that in Tunisia there is no visible "delivery system" which will link the existing body of knowledge to the needs of the small-scale

enterprises. If a rural small-scale industry program is to be developed for the project area, this delivery system will have to be established. Some organization must be responsible for carrying out the following actions, among others:

1. Audit the project area. Determine, research, and evaluate all factors that in some manner affect the area and the potential small-scale enterprises.

2. Determine, through analysis, the potential small-scale enterprises that best suit the project area.

3. Establish a systematic, comprehensive, technically feasible, systems approach to resolving the constraints.

4. Develop or have access to a body of information and knowledge that will provide the necessary technical, managerial, and economic know-how that is required in the development of small-scale enterprises.

5. Design, plan, and implement a program to attain the established goals.

6. Commit themselves (total dedication) to the established tasks.

Regardless of the listed constraints, there are several development possibilities that could be acted on at this time and which are recommended.

1. Establishment of a Service Park in Makthar. This could be a modest project which would have great impact in the project area. Many of the potential occupants of the service park are now in business in Makthar and would welcome the opportunity of moving to a better location. Much of the physical plant is now in existence and only needs restoration. This modest service park might well attract more entrepreneurs, sales outlets, and other enterprises.

2. Establishment of Activities in Kessra and Ruhia. Several ideas are offered in the Agro-Industry Potential section of this study. Once the problem of undependable water supply is resolved in Kessra and Ruhia, there are small-scale enterprises such as wool processing that could fit well into the local business environment.

3. Establishment of Tourist Tours. This recommendation would have to be researched further, but it would behoove the sponsor to explore this possibility and the options presented in the section titled Tourist Potential.

4. Establishment of a Development Program for Appropriate Small-Scale Rural Enterprises. If just this one recommendation were to be implemented by

the sponsor, a sincere attempt would then be made toward resolving the existing problems and meeting the desired goals. Unfortunately this fourth recommendation requires a long-term approach (four to five years initially); nevertheless, this appears to be the most viable and certain way of solving the problems of small-scale enterprises at the national level.

Appendix 1

SUMMARY OF MEETINGS HELD WITH PERSONS IN TUNISIA
BY THE GEORGIA TECH FIELD TEAM

SCHEDULE OF MEETINGS HELD WITH PERSONS
IN TUNISIA BY PROJECT TEAM

Date 1976-77	Location	Organization	Person
Nov. 4	Tunis	USAID Mission Tunisia	John Blackton and Tahar Ben Salem
Nov. 5	Tunis	USAID Mission Tunisia	Harmon Davis and Staff
Nov. 9	Tunis	Ford Foundation	Werner Kiene
Nov. 10	Siliana	Siliana Gouvernorat	Adberrazair Rekhis and Abdel Wahab Ktata
Nov. 10	Makthar	Secondary Tech School	Bechir Ben Brahim
Nov. 11	Ruhia	Ruhia Delegation	Abdelmajid Youssef
Nov. 11	Ruhia	Carpet Weaving School	Jamiia Mouelni
Nov. 11	Makthar	Makthar Delegation	Abdelmajid Chatti
Nov. 12	Ruhia	Ruhia Delegation	Abdelmajid Youssef
Nov. 12	Kessra	Omda of Kessra	Mohamed Khaddari
Nov. 17	Siliana	UTICA	Hamadi Sellaouti
Nov. 17	Siliana	OTTEEFP	Bechir Ben Belgacem
Nov. 17	Siliana	Agriculture Office	Mohamed Seoud
Nov. 17	Siliana	STEG	Office Staff
Nov. 18	Le Kef	STEG	Office Staff
Nov. 18	Makthar	Omda of Makthar	Amor Ben Regcha
Nov. 18	Makthar	Farmer-Businessman	Chedl Ben Amer
Nov. 18	Makthar	UTICA	Boubaker Cherif
Nov. 19	Ruhia-Makthar	Farmer	Shepherd (no name)
Nov. 19	Ruhia	Farmer	Tahar Resued
Nov. 19	Ruhia	Ruhia Delegation	Abdelmajid Youssef
Nov. 19	Makthar	Veterinary Office	Ahmel El Almi
Nov. 19	Makthar	Savings and Loan	Marmoud Khmir
Nov. 20	Makthar	UTICA	Boubaker Cherif
Nov. 23	Tunis	OTTEEFP	Ktari and Staff
Nov. 23	Siliana	OTTEEFP	Mustafa Ben Abdi
Nov. 24	Ruhia	Field Trip	Staff
Nov. 25	Tunis	OTTEEFP	Noureddine and Staff
Nov. 26	Tunis	UTICA	L. Guiga
Nov. 30	Tunis	Agricultural Office	Mogadi and Staff

(Continued)

Date 1976-77	Location	Organization	Person
Dec. 3	Tunis	UTICA	L. Guiga
Dec. 4	Tunis	Field Trip	Staff
Dec. 9	Tunis	Field Trip	Staff
Dec. 10	Makthar	Brick Plant	Staff
Dec. 14	Tunis	Minister of Plan	Machemi Ben Slimane
Jan. 20	Tunis	Minister of Plan	Machemi Ben Slimane
Jan. 21	Tunis	Office du Tourisme	Moncef Gaaloul
Jan. 21	Tunis	SHTT	Othman Bakir
Jan. 21	Tunis	Tourafric	Youssef Saidi
Jan. 24	Tunis	Minister of Plan	Machemi Ben Slimane
Jan. 25	Siliana	Governorat de Siliana	Abderrazak Rekhis
Jan. 25	Siliana	Minister de l'Equippement	Tahib Saadi
Jan. 26	Makthar	Savings and Loan	Mahmoud Khmir
Jan. 26	Al Mansurah	Farmer	Mohamed el Ayashi
Jan. 26	Makthar	UTICA	Boubaker Cherif
Jan. 26	Makthar	Municipality Makthar	Mohamed Bebiche
Jan. 26	Siliana	SONETE	Hamouda Ben Salem Hammami Mohamed
Jan. 26	Ruhia	Water System	Staff
Jan. 26	Makthar	Service Batiments	H. Hamdi, Habib Arfaoui
Jan. 26	Makthar	Labor Office	Fadhlaoui
Jan. 27	Makthar	Municipality Makthar	Mohamed Bebiche
Jan. 27	Makthar	OFPETT	Abdesselem Youssef
Jan. 27	Makthar	BNT	Abdelkader Benaissa
Jan. 27	Makthar	SRT	Yahyaouni Mancef
Jan. 27	Makthar	BT	Marakchi
Jan. 27	Siliana	Rural Development Program	Tayeb Kshda
Jan. 28	Al Mansurah	Farmer	Mohamed el Ayashi
Jan. 29	Tunis	SONETE	Staff
Jan. 29	Tunis	Minister	Habib Sbidi
Jan. 29	Tunis	Economie Nationale	Hassan Baussoufa
Jan. 29	Tunis	Environment	Moncef Kaak
Jan. 30	Tunis	Agronomist, AID	Rudy Vigil
Jan. 31	Tunis	API	Mohamed Laribi

(Continued)

Date 1976-77	Location	Organization	Person
Jan. 31	Tunis	CDEI	Nejib Caabane
Jan. 31	Tunis	FOPRODI	Abdelfattam Djemal

Note: A total of 65 interviews were conducted in carrying out the research activities for this study.

SUMMARY OF MEETINGS HELD
WITH PERSONS IN TUNISIA BY
THE IPD STAFF

THURSDAY, NOVEMBER 4, 1976: TUNIS

USAID Tunisia Mission

The team was met by Acting Rural Development Officer (TDY) John Blackton and his assistant, Tahar Ben Salem. Quarters placement and general briefing were conducted.

FRIDAY, NOVEMBER 5, 1976: TUNIS

USAID Tunisia Mission

The team was briefed by USAID Mission Director Harmon Davis, who discussed the parameters and thrust of the project. The GOT officials at Tunis Gouvernorat and delegation levels were noted, along with their particular interests. Mr. Blackton provided a summary of project development to date and ongoing requirements of the team.

An introductory meeting was held with Agricultural Officer Carl Ferguson and Assistant Agricultural Officer E. Gibson. General discussions were held with Messrs. Comeaux, Carter, and Buctha of the Agriculture Section.

The team, accompanied by Mr. Ben Salem, proceeded by hired car to Siliana and then to Makthar in the project area.

SATURDAY, NOVEMBER 6, 1976: RUHIA, KESSRA, AND TUNIS AREA TOUR

Ruhia, in the project zone, was next visited via P.4 and C.71 from Makthar. A tentative attempt to return by way of the Ruhia access to the projected roadway was altered because of vehicle incapabilities. After a northern leg up the undesignated road along the pump/well electrification line and study of the irrigated vegetable plots, P.4 was rejoined back to Makthar. The Makthar marketplace, several housing units, and several workshops were noted.

The mountain village of Kessra in the Kessra sector of Makthar delegation was visited. This ancient site is in the Corniche outcropping of a high massif. The village is built on Roman (and perhaps previous) ruins, utilizing much of the rubble in current construction. A primeval spring in the high rocks provides water for a stream flowing through the town, supporting some two

hundred inhabitants and numerous domestic ducks and geese. The town has modern electrification and several TV sets.

The team returned to Tunis via the Mansurah sector of Makthar delegation. Considerable pine and eucalyptus forest and reforestation was noted in the Sayar, Garaah, Kessra, and Mansurah sectors.

TUESDAY, NOVEMBER 9, 1976: TUNIS

Ford Foundation

Meeting with Dr. Werner Kiene, North African representative of the Ford Foundation. Dr. Kiene outlined the Foundation's preoccupation with farming improvement; he supported the general accuracy of recent FAO studies in the project area and Dutch studies in the general area radiating from Le Kef.

He cited a tendency to favor shallow tilling and seeding methods over traditionally practiced French deep plowing cultivation in the area. The following points were presented by Dr. Kiene:

1. Could experiment with Australian "jump stump" plow, i.e., to plow around and over stone. Stones have water run-off, earth denudation prevention feature.

2. The existing extension services are too modern and sophisticated.

3. Check ceramic clay potential with local potters. Charcoal is a constraint (also a waste of energy and a threat to ecology).

4. Check utilization potential of olive pits.

5. Check energy substitution and conservation potentials.

6. See John Simons/World Bank study on education in Tunisia.

7. Seeding at uniform depth (not necessarily deep) is key factor; find middle ground between "stick" (Egyptian) plow and mechanized plow.

WEDNESDAY, NOVEMBER 10, 1976: SILIANA, AND MAKTHAR SILIANA GOUVERNORAT

The team, accompanied by Mr. Ben Salem, traveled by hired car to Siliana. A primary meeting was held with the Siliana Gouvernorat Secretary General, Abderrazak Rekhis. Mr. Rekhis stated his first concern with respect to the project, as outlined in the letter "Visit of the Small Industries Team (from the Georgia Institute of Technology) to Sud Siliana and Tunis, November 4,

1976" passed to the several GOT officials by USAID Tunis, as being that of developing suitable employment for the younger people and avoiding their emigration from the Gouvernorat for lack of opportunity.

The Secretary General further stressed the desirability of additional craft training in the 14-15 year old male group. He was then posed the question of the acceptability and efficacy of cooperatives in the service organizations, transport, commercialization, production centers, etc. Were they acceptable, not acceptable, or taboo? The feeling gained from Mr. Rekhis' answer was that though cooperatives were not ruled out of planning, they had been tried and--whatever the previous experience--some reluctance might be encountered on the part of the farmers toward future coop activities. There was, he said, some cooperative activity in the Gouvernorat.

In discussing agricultural absorption of labor, Mr. Rekhis stated that agriculture was currently employing all the field laborers it could support. (Note: It is inferred that a significant constituent of the underemployed work force is "sitting" in the farms and farm settlements simply because they offer a roof under which to sit. There is, effectively, no unsheltered population.)

Mr. Rekhis mentioned a Government pool of tractors and equipment available with drivers for custom hire throughout the Gouvernorat.

The Siliana Delegation Delegate, Abdel Wahab Ktata, also was present at this meeting.

In summary, the Secretaire-General indicated the following:

1. Youth (12 to 30 years old) have unemployment problems.
2. Older women could work at home on income-supplementing activities; younger are not interested--would rather work away from home.
3. All general statistical type information from government sources should be requested through him (Gouvernorat Secretaire-General).

Secondary Technical and Lycee-Level School

At Makthar, the meeting with the Delegate was postponed, and the team took the opportunity to visit the secondary technical and lycee-level school. The school and its activities were discussed with School Director Bechir Ben Brahim.

This school provides full boarding for a current enrollment of 1,603 students. Some 777 boys are enrolled in a three-year general craft course,

for which a certificate is awarded. Another 117 boys are enrolled in a specialized technical six-year course, for which a diploma is given in the student's specialty: electrician, machinist, carpenter/cabinetmaker, etc. Approximately 98% complete the three-year course. No data are available on the six-year course, although the completion rate is expected to be high.

A seven-year humanities curriculum is offered for university entrance. Of the total enrollees, 513 are boys and 196 are girls. About 50% of these students complete the baccalaureate and receive scholarships to universities in Tunisia and abroad.

The teaching staff numbers 72 Tunisians, ranging from 25 with university licentiate teaching degree to five instructors with certificates from the three-year craft school curriculum. There also are 17 foreign teachers and instructors, including French, Bulgarian, and American. There is an administrative/maintenance staff of 54 men and 10 women.

Mr. Ben Brahim, who keeps loose records on former students seeking employment (he writes letters of recommendation to potential employers on request), is of the opinion that four fifths of those unemployed remain with the Gouvernorat, or as close as Le Kef and Kasserine. (Note: the unemployment figures and estimates available seem only approximate. The underemployed population must be calculated as considerable and, in many cases, the mere lack of funds is holding down emigration to coastal cities.)

The current level of enrollment was attained during the school's 13-year operation. Stress on the six-year specialized technical course is expected to bring total enrollment within several years to 1,800, which appears to be the institution's capacity. The excellent and ample machine, carpentry/woodwork, and electrical shops, along with reasonably spacious classroom facilities, would permit this growth.

From the meeting, the team gathered that the following summary is representative of this educational institution.

A. Technical High School (Lycee Technique) - established in 1963. Present enrollment - 1,603 (1,411 boys, 192 girls), as follows:

   1. Trades School (Enseignement Professionel) - three-year course - for different trades (masonry, carpentry, machine shops, electrical) - 24 classes, 777 students, all boys.

2. Technological-Industrial School (Enseignement Technique-Industriel) - six-year course - now in second year of existence, 117 students, all boys.

3. University Prep School
   - Seven-year course leading to degree (baccalaureate) with automatic qualification/admission to university.
   - First cycle ("Tronc Commun") - general/common prep course, lasting three years, 299 boys and 124 girls in 13 classes.
   - Second cycle ("Orientation") - specialized courses, by main discipline or profession, i.e., premedical, preengineering, etc., lasting four years, 218 boys and 68 girls, in 12 classes (all coed).

B. Faculty

1. Full professors (Professeurs d'Enseignement Academique), i.e., university graduates: 26, including one woman, teaching French.

2. Professors with some university-level education but not graduate/licensed: 15, all male.

3. Instructors, with completed six-year secondary technical education, and licensed: 21, male.

4. Instructors with partially completed six-year course, without license: 5, male.

5. Instructors, with completed three-year course and certificate: 5, male.

Total Tunisian Faculty	72
Foreign Faculty Staff: French, American (3), and Bulgarian	17

C. Administrative Personnel

Directeur (proviseur), supervisors (surveillants), procurement (economat), secretaries (dactylos), tutors (preparateurs).

D. Service Personnel (Ouvriers): 54 men and 10 women.

E. Completion Rates

Three-year course: 98% (The study team heard of too many dropouts - "defaillants" - in the project area.)

Six-year course: Unknown - no experience yet - started two years ago.

Seven-year course: 50% obtain the baccalaureate.

F. Employment Prospects and Experience of Graduates

All with baccalaureate go to university, most with government scholarships.

With six-year diploma: no experience yet.

With three-year certificate: 80% of those who graduated, about 1,500 during the last 10 years, did not find appropriate employment in the Gouvernorat; they have emigrated to Tunis, work on jobs were not trained for, or are idle.

THURSDAY, NOVEMBER 11, 1976: MAKTHAR AND RUHIA

Ruhia Delegation

Ruhia Delegation Delegate Abdelmajid Youssef echoed the Siliana Secretary-General's stress on developing employment to retain youth in the area. He noted their tendency to marry young (18-20) and to have six to 12 children. Though this observation may overstrain the statistics, it does make the Delegate's point.

The Delegate has been on duty two months and was quick to point out what he sees as obvious in the area. There are no craftsmen or services resident at Ruhia, no centers of transportation and no local entrepreneurial commercialization. Thus, there is no escape from the economic oppression of the big city-based middleman. Though the Ruhia Delegate averred that cooperatives might be a solution to central service and transport activities, he, too, felt that the farmers might look on such solutions with some suspicion.

He noted the requirement for entrepreneurial assistance in development activities. This again stresses the reliance of the countryside on the big city middleman and the substantial difference between farmer income for produce and retail price to the consumer. Though grain price enjoys some regulation, olive oil (price is pegged by the Government on the international market), fruit, nuts, livestock, rabbits, poultry, and mutton do not.

Ruhia Carpet Weaving and Knitting School

The Ruhia Delegate Abdelmajid Youssef accompanied the team to the girls' (12-19 years) textile school in the outskirts of Ruhia town. The school, ably

run by Directrice Jamiia Mouelhi, trains 25 young women living in for the six-month course. Some 90 women have been graduated during the school's several years of operation. Broad hand shuttle loom, embroidery, crocheting, and Swiss/Italian meter bar machine knitting are taught. A Swiss knitting machine is given to some graduates for cottage industry production.

The school products--rugs, draperies, burnooses, and sweaters--are sold through the National Artisan Office (ONA), which provides their yarn, or at auctions sponsored by the Regional Artisan Office. The products are graded and range from rejects to prime category woven tapestry with traditional designs up to 3 x 5 meter size.

The team summarized this visit in the following manner:

1. Marketing of agro products is the main problem for the delegation population; prices are dictated by buyers from outside the delegation who come to the village on market days.

2. The second problem is the unemployment of youth, 18 to 25 years old; most get married by their twentieth year (legal marrying age, for both sexes, is 18).

3. Need for service shops: blacksmith, auto-mechanical and electrical repair, masonry, carpentry (a carpenter from Sfax visits the village once a week).

4. There are four girls' carpet-weaving, embroidery schools in the delegation--one in Ruhia. Marketing their products is a problem.

5. A transportation cooperative or service is greatly needed. There is a promise from the Gouvernorat in Siliana for a daily truck run from Ruhia to Makthar and Tunis, to transport farm goods to market.

6. There are nationwide controlled prices (prix homologues) for essential consumer goods, such as: gasoline, olive oil (.350 D per liter), bread, meat (.900 D per kg in Tunis, but locally the farmers would lose money and unofficially prices are allowed to fluctuate upwards, up to 1.200 D per kg).

Ruhia Carpet-Weaving and Knitting School

1. Enrollment: 25 girls, 15-20 years, paid .200 D per day during a six-month course (total: 35 dinars), and some receive a sewing or knitting machine

after graduation, to continue working at home (mainly for family needs and friends).

2. Most girls are school dropouts.

3. Two or three girls work one month to produce a 2 x 4 m carpet, sold at public auction for 20 D per m^2 if first class (premier choix), 16 D per m^2 for second class, and 10 D per m^2, or whatever is offered, for third class (rejects). All products are inspected, classified, and sold in Siliana.

4. This is not a self-sustaining (paying) operation.

5. After six months, a final test is given by the government inspector; whoever fails can have remedial instruction for one or two more months.

6. The school is located in an old (colon) farmhouse, with the social worker (animatrice sociale) offices next door, where the girls are taught two hours a day. There is also a public bath next door.

7. Other products are wool sweaters for boys and girls, sold on auction for 2.500 D each, and bed covers, first class, 2 x 3 m, sold for 25 to 30 D.

Makthar Delegation

The team was received by Makthar Delegate Abdelmajid Chatti. Mr. Chatti, formerly at the Siliana Secretariate-General, mentioned several anticipated developments in the delegation. These were the reconstitution of an abandoned brick works near Makthar town, local spinning and dying of wool yarn, and a number of service organizations.

Mr. Chatti conducted the team on a visit to several in-town operations. A professional carpet-making installation has evolved from a previous girls' school. Some 25 young women are at work on a dozen looms creating tufted carpets in traditional designs. The work is deep nap, first quality. The workers are paid about 18 dinars per meter. Other graduates of this "coterie" have been assisted in establishing looms for individual production in their homes. A staff of two women and one man supervise this operation.

A second Makthar town training program is devoted to stone and wood carving. The stone carving consists of sculpturing jewel boxes and traditional plaques from the easily worked local limestone. The woodworking follows the same idea, with some artistry devoted to burning/etching. The school's 20 students also make fantasy wire bird cages along the lines of the Sidi Bou Said tradition.

A third school of 20 young women (some are dropouts from the Lycee) work at sewing machine embroidery and seamstressing. This is a well-run course of six months under an accomplished instructress. A foot-treadle Singer sewing machine is given to each graduate.

It was surmised from the discussion with the Delegate that workers were able to earn for their labor about half of the retail price on carpets, textiles, needlework, and sculpture. The craft programs are located in buildings adjacent to the delegation office.

The Delegate of Makthar suggested the following ideas for future consideration:

1. Wool Processing Facility in Kessra: 8,000 kg of raw wool at 600 millimes per kg, average price (range 550-650), to be washed by 40 women paid 50 millimes per kg, yielding 5,600 kg of clean wool (70% yield), dyeing at 550 mm per kg, spinning at 500 mm/kg, wool yarn sold at 2.200 D/kg (the estimates are only for direct labor and materials, i.e., no overhead, G & A, etc.)

   - Wool requirements
     For carpets: 1.4 kg per m^2
     For rugs (mergou): 1 kg per m^2
     For burnous: 4 kg per m^2
     For blankets (habadias): 1 kg per m^2
   - The above is for a six months turnover cycle, employing 40 women, and using local spring water.
   - The Delegate has identified two associates (investors) who would like to set up the plant in Kessra.

2. Brick-Making Plant (Briqueterie): Abandoned plant located two kilometers from the center of Makthar, on the road to Siliana. Abandoned for other than economic reasons. Power line 100 m away. Delegate has incorporation papers. Should restart as soon as possible, as demand for bricks is great in Makthar and Siliana, both for private and public building construction.

3. Tile and Slate Manufacturing Plant: Based on local limestone (calcaire) availability, from brittle to hard, sawable grade.

4. Carpet-Making School: 37 girls, age 15 to 18, mainly Lycee dropouts, the majority from Makthar, and a few from villages, living with relatives in Makthar. Qualifying exam after six months--no remedial classes nor repeaters. After completion, usually get married and stay home.

5. Carpet-Making Shop: 40 girls working in teams of four on a loom, earning 18 dinars per m^2, producing carpets sold in Tunis (Centre d'Artisanat) at minimum 34 dinars per m^2 for first category grade (premier choix).

6. Boys' Training School (mainly Lycee dropouts) in three groups:

- wood carving
- limestone ornamental cutting (sculpture) (working in dusty/primitive conditions, marginal quality)
- Bird cage making

All are paid 200 millimes per day, are given tools after course completion (six months), and are assisted in setting up their own businesses or in finding jobs (mainly in the Tunis Medina shops).

FRIDAY, NOVEMBER 12, 1976: KESSRA, RUHIA

Ruhia Delegation

The Delegate of Ruhia, Abdelmajid Youssef, again met with the field team and provided the following additional information:

1. Inventory (in Arabic) of Ruhia businesses.

2. Four new businesses being established in the villages, by local people, returning from France and Libya. Actually they are building four stone structures, and will eventually decide what to do with them.

3. Public housing project: part grant, part loan to owners.

4. Mineral deposits in delegation; three samples were collected, and these will be taken back to Georgia Tech for appropriate analysis.

5. Water well, abandoned/sealed in the 1930s, recently reopened--foul smelling--needs water quality analysis.

6. Will give the team next Thursday, November 18, a list of specific projects needed in Ruhia delegation.

Omda of Kessra

Meeting was held at Kessra town with the sector Omda, Mohamed Khaddari, and the Kessra veterinarian, Ahmed Almi.

The team visited a carpet-making center and school located in the town hall, operated along the same lines as that at Makthar, with some 20 young

women in apprentice-paid production. Individual women also produce tied-tuft carpets on commercial-size looms in their homes. One such cottage installation was examined by the team.

Local thatch and mud beekeeping hives (ruchers) were visited near Kessra, as well as modern hives at the adjacent forestry seedling nursery installation. The Forestry Office is promoting modern beekeeping throughout the region.

For all its mountaintop remoteness, Kessra town is an active microcosm. The immediate vicinity maintains some 3,000 sheep, 400 ducks and geese, and considerable other poultry, including turkeys, though none of this with notable organization. The abattoire and skinning work is random and individual. Hides are flayed expertly, though washing and sun curing is rudimentary. Sheep treating and shearing is apparently done on a catch-as-catch-can basis, though with traditional know-how. Some local dyeing of wool with both natural and chemical dyes is done, although most of the local wool is shipped raw to centers such as Kairouan and as far as Tunis. The bulk of dyed yarn for carpet making is purchased from the Government Artisan Centers.

The possibility of commercial rabbit hutching was discussed. The Omda expressed concern that there was insufficient forage, i.e., radish, beet, and other toppings, to support such a project. However, a general estimate by the team indicates enough scrap forage for some scale of rabbit growing.

The information gathered may be summarized in the following manner:

1. In Kessra sector: 3,000 sheep; 400 ducks; bees/honey (traditional-prehistoric) and forestry station (modern); chickens.

2. Carpet-making school, in sector headquarters building: 90 graduates so far, working at home, using local wool, processed at home.

3. Arabic/French teacher from Gafsa (visited his home): On four-year tour of duty in Kessra. Wife making carpets at home from wool given by his father. Does not think much of local carpet school; in his region, all girls at age 5 to 6 learn carpet making at home, and do much better. Sells wife's carpets in Kairouan.

4. Omda is aware of Makthar Delegate's plan for a wool processing plant in Kessra.

5. Forestry station (Pepiniere), established in March 1958, mainly seedlings of Aleppo pines; beehives; flowers; shrubs.

WEDNESDAY, NOVEMBER 17, 1976: SILIANA

UTICA

The team met with resident UTICA representative Hamadi Sellaouti. . According to Mr. Sellaouti, the local industrial development projects are as shown in the accompanying table.

Mr. Sellaouti also made the following comments:

1. Local Industries:

   - Brick-making plant started operations in 1969, was closed due to financial and "political" reasons (problem with cooperatives). Should be reopened as soon as possible, as the demand (market) is there, as well as the raw materials and skilled labor.
   - Limestone quarry (industrie de carlage), to produce flagstone, tiles, slates, etc. Needs material/product testing.
   - Dressmaking factory (usine de couture)--not shown on the list--was established north of Siliana, but failed due to lack of adequate marketing.

2. Team should visit the UTICA headquarters in Tunis, and particularly their projects study office--SEPIT (Societe d'Etudes des Projets Industriels Tunisiens).

3. UTICA representative in Makthar: Boubaker Cherif
   UTICA representative in Ruhia: Hassen Ben Hassen

Labor and Employment Office

The team visited the Labor and Employment Office (OTTEEFP), where the Assistant Labor Officer, Bechir Ben Belgacem, discussed employment and human resources in the area. A questionnaire on labor employment and appropriate skills was devised and left to be completed by Mr. Ben Belgacem and the OTTEEFP staff.

Agriculture Office

The team and Ben Salem next visited the Government Agriculture Office and interviewed the Deputy Officer, Mohamed Seoud. Mr. Seoud has a number of years' experience in the area and was most helpful in discussing an agricultural production statistics table to be completed by his office.

SMALL INDUSTRY DEVELOPMENT PROJECTS AND
POSSIBILITIES FOR MAKTHAR AND RUHIA DELEGATIONS
(as outlined by Mr. Hamdi Sellaouti, Head of
UTICA Office in Siliana)

Type of Industry	Total Invest. (In Dinars)	Employment	Projected Annual Produc.	Annual Local Needs	Sources of Raw Materials
Brick-Making Plant	600,000	150	45,000 T		Sidi Hamada, Siliana Delegation, Kessra, Makthar Delegation
Lime Factory	250,000	30	75,000 T	60,000 T	
Tile Factory	550,000	95	155,000 m^2	120,000 m^2	
Plaster Factory	250,000	50	70,000 T	55,000 T	
Tannery	50,000	80			Bovine population in entire Gouvernorat, 230,000 head
Wool Processing Plant	200,000	102	360 T		
Detergents Factory	200,000	40	120,000 T		

Remarks: It is recommended that a thorough geographic (geologic) study be conducted in order to define the nature (characteristics) of the soil in the region and its availability (and suitability) as raw materials for the different types of industries listed above, and possibly others.

Societe Tunisienne d'Electricite et Gaz

The next visit was to the Societe Tunisienne d'Electricite et Gaz (STEG). They provided the following information:

1. Current is 220 and 380 volts (for water well pumps and larger motors).
2. Tied to nationwide network (La Goulette thermal plant and hydro-power plant in the North).
3. No capacity or overload problem.
4. Power line runs 100 meters from old brick factory near Makthar. Needs transformer.
5. Power grid map available in Le Kef Office (open 0745-1800), and possibly in Tunis office. Grid map was later gathered at Le Kef, and it appears in this report.

THURSDAY, NOVEMBER 18, 1976: LE KEF, MAKTHAR, AND RUHIA

STEG Regional Office

The regional STEG office at Le Kef was visited and schematics of the area's electrical distribution network were copied and discussed.

Ben Amer

The Makthar town Omda, Amor Ben Regcha, was instrumental in arranging a visit by the team to a well-run 120-hectare farm owned by Chedli Ben Amer. Though essentially a grain producer, Mr. Ben Amer has about 15% of his land in olives and irrigated vegetables. The existing hand-dug six-meter well will be supplemented with an 18-meter well when electricity becomes available next year. He currently uses battery power (charged in his Steyer 870 tractor) for TV broadcasts from Tunis. He mentioned particular interest in agriculture extension programs, giving seed and planting advice.

Mr. Ben Amer operates the farm with the assistance of several dependent members of his immediate family living in a complex about the main buildings. Along with the tractor mentioned, the farm has its own tilling equipment. However, reaping and haybaling are custom hired (the cost of baling is 110 millimes per bale). The family owns one fairly recent model Peugeot and one somewhat more ancient.

An advanced farmer, and certainly among the most prosperous, Mr. Ben Amer seeds with government-supplied select wheat, exchanging one quintal (100 kilograms) plus 10 kilograms of crop wheat for each quintal of government seed.

UTICA-Makthar

The UTICA representative in Makthar, Mr. Boubaker Cherif, is also the owner of the largest wholesale grocery store in that town. He provided the team with the following listing of local industries or shops:

Type of Industry or Shop	No. of Shops in Makthar
Carpentry	5
Automotive R & M	4
Electrical R & M	1
Electronics R & M	0
Blacksmith	1
Camera/Xerox	2
Leather work	0
Bakery (one modern, one traditional)	2
Stone cutter	4 or 5 (individuals with hand tools only)
Flagstone/tile	a few individuals
Watch repair shop	1
Stone crushing plant (with one machine inoperative most of the time)	1
Plumber	3 (individuals - no shop)

In the 1960s, there was a knitting factory (centre de tricotage) with a Bulgarian woman as manager (monitrice, gone by now), 20 machines, producing quality goods. Failed because of "coop problem." Four or five of the women workers are still in Makthar, teaching knitting. Could be reestablished with some local capital and outside investment/loans.

FRIDAY, NOVEMBER 9, 1976: RUHIA AND MAKTHAR

Field Trip

The team then investigated the northern access to the projected MC.77 surfaced roadway, but after five kilometers found it impassable--even by Land Rover--due to rain that day.

In the area a local shepherd, one of 125 families living in camel hair tents in the area, was visited. Supported by a flock of 80 sheep grazing on public land, this family lives in antique dignity and simplicity. The oldest son, speaking impeccable French and English, is in his second year with a university scholarship at Tunis.

Two kilometers north of Makthar, the team inspected the closed-down brick works which the Delegate is treating with the private sector to reopen. The mixer, extruder, diesel motor, and drying rooms appear intact. The two kilns require considerable stack rebuilding. Maximum capacity could be estimated at several tons per day of the thin-wall, longitudinally perforated, tile/brick forms used throughout Tunisia for light masonry. An estimated 10-year supply of clay is located within several hundred meters of the works. Water is supplied from a well on the grounds. Electricity is now available at the site.

The team also visited the 80-hectare farm of Tahar Resued near Ruhia town. About evenly divided between olives, forage, and grain, the farm is also maintaining a 60-head sheep flock, a bull, and eight milk cows. The farm's 20-meter well is caved in and water is tanked from the town facilities. Several outbuildings are in need of repair, but Mr. Resued is reluctant to borrow to finance needed work. Otherwise, Mr. Resued and his farm maintain the appearance of a satisfactory operation by local standards.

Ruhia Delegation

Yet another visit was made to the delegation office in Ruhia, and this additional information was gathered:

1. Village and delegation need:

   - Sewing and knitting shop (atelier de couture et de tricotage), for employing local girls. Could be organized as an "Artisanat" unit, same as in Makthar, or as private unit--corporation or cooperative. According to him, "coop" is not a scare word in Ruhia; the interested individuals/participants have to be convinced of their specific roles in the enterprise and the expected return on investment.
   - Tanning factory.
   - Wool processing plant.

2. Farmers cannot obtain bank loans for equipment acquisition as they have no collateral--title to their land. Land ownership/border

disputes are frequent. The Government is surveying farmland for the purpose of granting ownership titles, but the process is slow and painful.

3. Shop and business owners are in the same quandary: they have no collateral (guarantie) nor techno-economic project studies to justify request for investment-type loans.

4. The Government (official) unemployment figures are grossly underestimated and should be multiplied by a factor of 50 or 100. (Later, the labor/employment office people in Siliana implied a factor of 2.)

5. A few years ago, the Government granted 250 dinars and loaned 250 dinars (apparently a common practice for housing and rural development assistance) to each of the four individuals in Ruhia for the purpose of building a carpentry shop; nothing happened. Lately the Delegate discovered one of them who now wants to build a large "plant," while the Delegate is urging him to start right away with a small shop and expand later.

6. "Small Industry" Inventory in Ruhia:

Auto Repair Shop (Mecanique)	1
Blacksmith	1
Plumbers	3 individuals
Masons	3 individuals

Visited the first two (see questionnaire summaries), while the other six were not around.

7. The village and delegation desperately need a wholesale grocery-type store (like the one in Makthar), as the existing one has very little to offer. (This was confirmed by stopping by in the store.)

8. A major developmental problem is to educate the few local "capitalists" and potential entrepreneurs (promoteurs), who now hold money in S & L associations and banks, on how and where to invest. (This will take a long time.)

Makthar Veterinary

A meeting was held at the Makthar Veterinary Office with Dr. Ahmed El Almi and his staff. Estimates of cattle and sheep population in the area were discussed with respect to the annual slaughter and birth rates. The census

data on the area animal population are considered only approximate, due to random slaughter practices. Roughly the annual slaughter is calculated as 100% of the bovine stand and 150% of the ovine. The yearly overall livestock stands appear nearly static.

Savings and Loan Bank

The manager of the Makthar savings and loan bank, CLCM (Caisse Local du Credit Mutuel), Mr. Marmoud Khmiri, met with the team and provided the following information:

1. The team should try to meet Mr. Mohamed Ayashi, a resourceful entrepreneur in the El Mansura sector, who has many ideas on the agro potential development of the area. He owns an olive press and is extracting rosemary oil.

2. The S & L association is paying interest on savings from 3.5% to 6.5%, depending on duration of deposit (nationwide practice).

3. Credit to farmers (credit agricole) is given for the seed and fertilizer only, not for equipment purchase (lack of collateral), at 6% interest, and to other businesses (credit commercial) at 8% interest only for working capital needs. Defaults on the former type of loans are frequent (poor crops), and few for the latter.

4. Loans and savings do not balance locally; the latter amount to much more in the area.

5. There is no commercial bank in Makthar; the nearest one is in Siliana.

6. Savings accumulated in this area are usually used to buy sheep and cattle stocks in Tunis, or are placed in the CLCM.

7. Regarding the team's interest in an industrial estate site, they should take a look at the Public Works (formerly Ministere des Travaux Publics, now Ministere de l'Equippement) yard in Makthar, near the soccer field.

SATURDAY, NOVEMBER 20, 1976: MAKTHAR

UTICA-Makthar

A discussion was held at the Makthar UTICA office with Boubaker Cherif concerning current prices and entrepreneurial practices in the harvesting and marketing of honey, almonds, and olives.

The former industrial park, now serving as offices and equipment grounds for the Highway Department, was examined for possible project consideration. It has accessible electricity and city water and is located less than a kilometer from the heart of Makthar township.

TUESDAY, NOVEMBER 2, 1976: TUNIS AND SILIANA

OTTEEFP-Tunis

The team was received by the OTTEEFP (Labor and Employment) Director, Mr. Ktari, and staff at Tunis. The general availability of workers in required specialties in the project area was confirmed. The urgency of project implementation was stressed by Mr. Ktari.

OTTEEFP-Siliana

A meeting was held with Mr. Mustafa Ben Abdi, head of the office, as well as Mr. Bechir Ben Belgacem and Abdel Wahab El Gharbi. They provided the following information:

1. Written summary of labor statistics for the project area, which they obtained by telephone from their representative in Makthar who is also responsible for Ruhia.

2. Minimum employment age is 18, and 14 for apprentices. This creates a problem: lycee graduates under 18 are necessarily unemployed (chomeurs), as they do not take apprentice jobs, being overqualified (diplome).

3. Unemployment statistics are underestimated by 40% to 60%, as many unemployed do not register in the office or do not even know about its existence. (According to the Ruhia Delegate, only 1% to 2% are covered by these statistics.)

4. Women have an unemployment/underemployment problem.

WEDNESDAY, NOVEMBER 24, 1976: RUHIA

Inspection of Project Route MC.77

By Land Rover, the team entered the proposed system at Ruhia, traveling eastward to join the north-south path at Jmilet School. The route was followed south into Hababsa sector, and the government settlement buildings (several houses, a dispensary, and equipment shed under construction for three months)

were visited. The nondesignated path to the spring and drinking water storage works under construction at Oued Kouki some six kilometers east of Chouchet Hababsa was examined.

The project MC.77 roadway was regained and followed north through Smirat, Ellouza, Essouelem, and Sayar sectors to Makthar. The half-dozen primary schools served by this system, as well as the many access paths, were noted. In all, about 67 of the 77 kilometers of the system were traversed by the team. Even after a week of dry weather, a number of fordings and passages were difficult.

THURSDAY, NOVEMBER 25, 1976: TUNIS

Office of Tunisian Workers Abroad, Employment and Vocational Training

Meeting with the Directeur-General of the Office des Travailleurs Tunisiens l'Etranger, de l'Emploi et de la Formation Professionelle, Mr. Noureddine. At this time, the following information was provided:

1. ILO is conducting a multi-year, nationwide study of Tunisian small business. They are now surveying larger cities, to be followed by in-depth investigations by business type, e.g., all carpentry shops. Some draft reports are available now.

2. Major Tunisian human resources development problem: The more technicians and specialists are being produced, the more they flock to Tunis. After being exposed to the "good life," even via TV, they do not want to return to the interior.

3. Agreement with the Netherlands: There are 3,000 to 4,000 Tunisian workers in Holland. With their economic recession persisting, the Dutch would like to see the immigrant workers go back home. Tunis, on the other hand, has no employment opportunities for them. The Tunisian Government has agreed to cooperate with the Dutch Government by discouraging any further outflow of Tunisian workers to Holland, while the Dutch Government is now providing technical assistance to Tunis in developing employment opportunities in Tunis for workers returning from Holland.

4. Willing to explore possibilities of industrial extension services in Tunis, probably through the different technological institutes (i.e., Institute du Batiment) of the University of Tunis.

5. Tunis had a bad experience with cooperatives ("pushed too hard"). Thus, they are still unpopular and unacceptable. (Tunisian Government's pragmatic approach to socio-economic problems.)

FRIDAY, NOVEMBER 26, 1976: TUNIS

UTICA-Tunis

Meeting with Mr. L. Guiga, Secretary-General of UTICA (Union Tunisienne d'Industrie, du Commerce et d'Artisanat). He indicated the following:

1. Asked for team's definition of industrial estate (parc industriel). According to him, it is equivalent to a "centre de services."

2. Stated that all of Tunisia, and particularly Tunis, needs industrial parks. He asked how the project could assist UTICA on both industrial estate and crafts center development, and specifically to provide them with the latest complete set of AID industrial profiles (French version). Tahar Ben Salem will follow up with AID.

TUESDAY, NOVEMBER 30, 1976: TUNIS

Agriculture Office

A team member had a further visit with Mr. Mogadi of the Government Agricultural Staff to develop a list of public and private water points in Makthar and Ruhia delegations. Public wells, springs, and cisterns also were plotted on the area map for project use.

FRIDAY, DECEMBER 3, 1976: TUNIS

UTICA-Tunis

The team met with Mr. L. Guiga, Secretary-General of the Technical Union for Industry, Commerce and Crafts (UTICA). In the meeting, the team discussed some of the problems UTICA considered as having a high priority. The craft industries need technical assistance, central purchasing for raw materials, market support, and other assistance. Mr. Guiga told Mr. Hirsch that AID should provide the type of technical assistance that he knew Georgia Tech had provided to other developing countries.

SATURDAY, DECEMBER 4, 1976: TUNIS

Field Trip

Part of the team decided to go back to the field and revisit La Mohammedia, Bir M. Charga, Majus, El Fahs, Sbikha, Kairouan, and overnight

in Sbeitla. The following day, they would then go to Sbida, Ruhia, Makthar, Siliana, Medjez El Bab, and back to Tunis. At about 41 kilometers from Kairouan, the rental vehicle broke down and the trip had to be abandoned. The team member caught a local bus to Kairouan and there were able to negotiate with a taxicab company to take them back to Tunis (about 200 kilometers). After a long period of waiting for an available vehicle, they got one and then returned to Tunis, arriving about 8:00 p.m.

THURSDAY, DECEMBER 9, 1976: TUNIS

Field Trip

Again part of the team returned to the field in a rental vehicle. They took the road to El Fahs and from there to Kairduan, continuing to Haffouz and Kessra and arriving at about 4:30 p.m. They revisited the village, the water and power supply, and other factors that are discussed in the project paper. The team, by then, had traveled 233 kilometers on the Tunis to Haffouz road and about 23 kilometers from Haffouz to Kessra. They continued to Makthar, but about three kilometers out of Kessra had a blowout and had to change tires. Arrived in Makthar at about 6:00 p.m., at which time it was dark. The tire was repaired and the team continued on the road to Sbeitla, where they were to spend the night.

About 13 miles out of Makthar, the vehicle skidded off the road and nearly rolled down the side of the mountain. As a result of the accident, the rear axle of the vehicle was damaged. After about an hour, another vehicle came by and offered to follow the damaged vehicle back to Makthar and provide assistance if the car failed to make it back.

Arrived at Makthar with the disabled vehicle at about 9:00 p.m. Spent the night at the Marhaba Hotel in that village.

FRIDAY, DECEMBER 10, 1976: MAKTHAR

Brick Plant

Revisited the buildings proposed for the "service park," as well as the now closed brick plant on the outskirts of Makthar. Pictures and dimensions were taken of both installations and some additional data were gathered for the report.

TUESDAY, DECEMBER 14, 1976: TUNIS

Ministry of Plan

A meeting was held with Mr. Slimane to present to him some of the ideas that are in the recommendations section of this report. The ideas were well received by this government official.

Note: During the month of January 1977, Mr. M. Radovic returned to Tunisia and held the following meetings during his stay.

THURSDAY, JANUARY 20, 1977: TUNIS

Ministry of Plan

Meeting with Mr. Machemi Ben Slimane, Regional Planning Directorate, to review the following aspects of the research study:

1. Legal/Administrative Milieu. He feels this is not a constraint and that there is no need for the research study to look into or review Tunisian laws. The governors and delegates have all the latitude needed to initiate or set up new enterprises in their political areas. Cooperatives are only to be considered in agricultural activities. All other types of cooperatives were abandoned by the government in 1969. He provided a set of regulations for starting business in Tunisia, both as a native and as a foreigner.

2. Urban Planning/Zoning. The master plans or "plans d'amenagement" are not up-to-date. Insofar as he is concerned, this would have no effect or bearing on rural small industry development.

3. Environmental Aspects. Again, Mr. Slimane indicated that these would not be a constraint, particularly in the target area.

4. Transportation. The road system serving the target area is adequate, in Mr. Slimane's opinion, for small and rural industries. He feels that air and rail transport are irrelevant for "rural small-scale industries."

5. Water. Believes enough water is available for the type of projects that would be developed for the area, but suggested that this be checked out with the Societe National d'Exploitation des Eaux (SONEDE) both at Siliana and in Tunis.

6. Tourism. Mr. Slimane believes this would be an interesting industry to look into and suggested that the Tourism Promotion Office in Tunis be contacted.

FRIDAY, JANUARY 21, 1977: TUNIS

Office du Tourisme

Meeting with Mrs. Moncef Gaaloul, Head of Direction des Programmes. She indicated that the Government of Tunis Tourism Department has as a priority the touristic development of the Sahara Desert in the area of scientific-cultural tours. They have no budget allocation for activities in Makthar. She also indicated that they would be glad to assist with some small improvements if a project were initiated for Makthar.

According to Mrs. Gaaloul, there is excess hotel capacity in Sbeitta: Suttertula has 72 rooms, Bakini has 23 rooms, and these two hotels have an average occupancy of about 25%.

The large majority (90%) of the European tourists are interested in what she calls the three S's (sand, sea, sun), i.e., Tunisian beaches. The European tourists have more than enough "cultural" and archeological sites in their respective countries.

Societe Hoteliere et Touristique de Tunisie (SHTT)

At a meeting with Mr. Othman Bakir, the manager, he indicated that they operate 14 hotels in Tunisia. Information was gathered on their hotels, rates, and locations. The SHTT was organized by the GOT to promote tourism; they have divested much of their holdings and at present are not interested in investing in any new facilities or even managing any additional hotels. They suggested that contact be made with a private hotel chain to see if they would be interested in establishing a hotel in Makthar.

Tourafric

This tourist tour group in Tunis also was visited. A meeting was held with Mr. Youssef Saidi, Sous Directeur (assistant manager), to determine the possibilities of including Makthar (Mactoris, the Roman town) on their tour schedule. Mr. Saidi used to be with SHTT and knows the area well. He indicated that if somebody were to establish adequate facilities (i.e., cafe-restaurant-hotel) at Makthar, they would consider including a tour to the old Roman town of Mactoris. At present they only have a brief stop there in one of their tours. Mr. Saidi also made available tour information and a price list of their different tours.

MONDAY, JANUARY 24, 1977: TUNIS

Ministry of Plan

Again a meeting was held with Mr. Slimane to review the "Plan d'Amenagement" for the target area. He suggested contacts be made with Agence Fonciere Industrielle (Industry Realty Agency) for additional details, Mr. Hassen Boussafa of the Ministere de l'Economie for environmental aspects, and the GRDA (Government Regional du Developpement Agricole) for labor statistics. All the above contacts were made and data were collected from each of these organizations.

TUESDAY, JANUARY 25, 1977: SILIANA

Gouvernorat de Siliana

Meeting with Mr. Abderrazak Rekhis, Secretaire General, to review data requirements and to identify new sources.

Ministere de l'Equippement

Held meeting with Mr. Tahib Saadi, acting chief of the regional office for Service Ponts et Chausses. This organization would like to retain about one third of the area (buildings and grounds) selected for the "service park." He indicated that the Office des Cereales also wishes to retain the southeast corner (five bays). The balance would be made available to the project to house the workshops that have been suggested in this study. Mr. Saadi also indicated that a formal request to Mr. Chatti would be necessary, as he is the Delegate of Makthar.

WEDNESDAY, JANUARY 26, 1977: MAKTHAR

Caisse Locale d'Epargne

The local savings and loan office is administered by Mr. Mahmoud Khmir, and this meeting with him was to gather information on savings and loan operations in the area.

Businessman-Farmer

At Al Manjurah, a meeting was held with Mr. Mohamed El Ayashi, who is a producer of olive oil and rosemary extract and also has an insurance business. In the meeting, he indicated that usually funds from savings and loan type organizations are available to farmers for purchasing seeds and payroll, but

not for equipment or investments. Reputable businessmen use commercial loans for new ventures.

UTICA-Makthar

Mr. Boubaker Cherif is president of this organization and the owner of a wholesale grocery store. He indicated that the knitting (tricotage) plant operated until 1973 and it was under the direction of a Mrs. Yaneff, a Bulgarian lady whose husband, Dr. Yaneff, was a general practitioner working in Makthar under contract from 1969 to 1973. He also indicated that there were talks of a new brick plant being built in the future near Makthar. Raw materials are being tested in France at this time.

Municipality of Makthar

The clerk (commis administratif), Mr. Mohamed Bebiche, reviewed the 1964 Plan d'Amenagement for Makthar. He was unable to give the interviewer a copy, as he had no copies left, but he suggested getting a copy from either Mr. Yusset at Ruhia or Mr. Chatti.

Municipal Park

There is an abandoned municipal park across from the Mactaris museum which could be refurbished and used as an attraction to visiting tourists as well as for the local population. There are two potable water fountains, Roman stones, an old cafe, two rooms in the wall below the Roman arch, stone tables and chairs, flower beds, children's playground, tennis court, and walkways.

Brick Plant

The old brick plant (two kilometers north of Makthar on the Siliana Road) was revisited. This plant is in need of major repairs, but it may be less costly to do this than to build a totally new plant. There is a need to do a cost-benefit study.

SONETE-Siliana

Meeting with Mr. Hamouda Ben Salem and Mr. Hammani Mohamed to obtain information on water in Kessra. They have no information, as this is out of their jurisdiction and it is not a municipal water system.

The municipal water system for Makthar was reviewed and maps obtained. The source of water is the Aih Mhala, with an output of 73 cubic meters per

day, enough for the 11 to 16 hours of daily operation. The water is stored in a semiburied 500-cubic meter tank. The indicated maximum annual output of the system is about 750,000 cubic meters. The 1976 consumption was as follows:

First Quarter	38,736 m^3
Second Quarter	42,154
Third Quarter	44,616
Fourth Quarter	44,227
Total for 1976	169,733 m^3

It is deducted from this information that only 25% of the capacity currently is being utilized. The water is of good quality and is treated with chlorine by the municipality.

Ruhia Water System

A map of this system also was obtained. The water comes from SBIBA (Kasserine Gouvernorat), and is carried by a 125-millimeter pipe; the system has a draw-off to Djedeliane. The consumption data for 1976 are as follows:

First Quarter	5,220 m^3
Second Quarter	7,419
Third Quarter	6,955
Fourth Quarter	7,108
Total for 1976	26,702 m^3

The pipe from Sbiba leads to a 50-cubic meter storage tank, but for the past four or five months the tank could not be filled because of low pressure in the line. This is due mainly to the fact that the draw-off at Djebeliane is open all the time, creating a pressure drop.

There are plans for a new well to be built at a location about five kilometers from Ruhia. The well will have a three-meter inside diameter and will be 4.2 meters deep. The well will be ready next summer. It will provide more than enough water for the Ruhia population and have some excess to be eventually used by small industries in that location.

Service de Batiments

The meeting with Mr. H. Hamdi and Mr. Habib Arfaoui, Chief du Service de Batiments (construction department) of the Ministere de l'Equippement, proved very successful. They were able to provide copies of the "Plans d'Amenagement" for both Makthar and Ruhia. The only available plans are very

old, and they indicated that since no one pays any attention to them, no new ones have been made.

They also had design copies of the new brick plant which were prepared by Morando-Lyons in France for the Comite Fondateur de la Briquetterie de Makthar on October 18, 1976. The plant design shows an initial capacity of 60 tons per day and 120 tons per day for the second phase. The initial investment is established at 800,000 dinars. The Service de Batiments is now deciding on the plant location, to be as near as possible to the existing raw materials.

No cost-benefit analysis is available at this time or any comparison between the new plant cost and that of rebuilding the old plant.

Labor Office

Meeting with Mr. Fadhlaoui, Chef, Inspection de Travail, who is responsible for labor contracts and work safety enforcement. He indicated that minimum wages, by skill or trades and seniority in service, are uniform and strictly enforced in all of Tunisia. At times an employer based on supply and demand may pay more than the minimum. In Tunis, for example, a machinist (lathe operator) can get 60 dinars per month, whereas in Makthar, he would get the minimum wage.

To approximate present salary levels (as per tables for 1975 in use), it is necessary to add 15 millimes to the bottom wage and 10 millimes to all other categories. In addition, all wages will be raised an average of 33% as of February 1, 1977. Additional salary and wage data were gathered at this office.

THURSDAY, JANUARY 27, 1977: MAKTHAR

Municipality of Makthar

Mr. Mohamed Bebiche was able to provide the sewer and drainage plans for this community. As had been indicated by other engineers visiting Makthar earlier in this program, there is a natural drainage slope away from the town at the service park location.

Bureau de l'Emploi, Siliana

Meeting with Mr. Abdesselem Youssef, Chef du Bureau de l'Emploi, who indicated that wage differentials in Tunis are relatively small and nobody

can be paid less than the minimum which is established in the employer-union agreement. He believes that there is enough skilled labor in the area and training for small industry employees may not be necessary.

Banque National de Tunisie (BNT)

The BNT Siliana office is managed by Mr. Abdelkader Benaissa. They provide agro-credit (no commercial) to local farmers. The bank is fully decentralized, so they can issue credit in one day. Again inquiries were made about industrial development investments, and Mr. Benaissa indicated that only API and FOPRODI have that type of credit line.

Societe Regionale de Transport du Kef (SRT)

This organization has a station at Siliana; it is managed by Mr. Yahyaouni Mancef, who is the Chef du Station. Bus schedules and rates were obtained from him. Their 1975 Annual Report (Rapport d'Activites de la SRT du Transport du Kef, 1975) shows that they provide bus, truck, and taxi service in the region with 15 agents in Makthar and five in Siliana. The company operates 54 trucks (mostly Fiat), 24 miscellaneous vehicles, and 12 hauling vehicles.

All rates and schedules for these various services were obtained from Mr. Mancef for future use in this report.

Banque de Tunisie (BT)

The Banque de Tunisie has a branch office in Siliana and the manager, Mr. Marakchi, visits it once a week from the branch office Medjez-el Bab (the tour is Testour--El Ardussa--Gafour--Siliana). They offer only commercial loans. There is very little business in Siliana, and that is why the BT changed that office from a full-time branch to the present status.

He indicated that for eventual investment loans the BT would require 30% cash deposit from the borrower, who would have to be a "well established and reputable customer." Thus, for all practical purposes, a small industry would best address its loan request to FOPRODI and not to a bank such as BT. FOPRODI is geared to provide extra benefits, such as nonpayment of custom duties, low-interest loans, five-year grace periods, and others.

Programme du Developpement Rural

Meeting with Mr. Tayeb Kshda, who is the Director of Rural Development in Siliana. He provided some additional information and indicated that he, as

well as the Ministry of Plan, was very dissatisfied with the small industry component of the program.

So far, the following loans (prets accordes) have been issued by the Rural Development Program for all activities:

Loans 1974-76 (in dinars)

	Makthar				Ruhia			
Type	1974	1975	1976	Total 1974-76	1974	1975	1976	Total 1974-76
Agriculture	2,916	-	8,610	11,526	12,229	1,600	13,535	27,364
Artisans	-	-	-	-	-	-	-	-
Various Small Crafts	2,500	8,500	1,600	12,600	3,400	1,000	1,000	5,400
Total	5,416	8,500	10,210	24,126	15,629	2,600	14,535	32,764

FRIDAY, JANUARY 28, 1977: AL MANSURAN

Farmer-Businessman

Mr. Ayashi has olive presses in operation as part of his farm (diesel engine, stone grinder, two vertical presses, six settling bins, and 50-ton holding reservoir). This installation produces about 80 tons per year and employs 18 persons from December to February. Next to his farm, there is an old abandoned GOT military base that he would like to obtain (two hectares) in order to use five structures that are in existence for cattle raising. Also has 30 rosemary extraction stills in Makthar sector; each still has two tanks, one with rosemary cuttings being heated in a water bed and distilled through a pipe into a second water tank, and then in a draw-off extraction through the bottom. He could combine all into about six good-size units. Present capacity is about 15 to 20 tons per year. All transportation is by hand or animal traction. He also has an operation extracting thyme and "shih" (Arab word). Has no interest in becoming involved in small industry. Has no interest in raising bees, rabbits, or chickens.

SATURDAY, JANUARY 29, 1977: TUNIS

SONEDE

Contacted the Service Hydrogeologique for data on the Kessra water supply. They were unable to help and suggested a contact with the Ministere de l'Agriculture.

Ministere de l'Agriculture

Mr. Habib Sbidi, Director of the Direction de Resources en Eau et en Sol, was not there, but the librarian indicated that Kessra was a natural water point. This ministry is responsible for drinking, industrial, and irrigation water.

Ministere de l'Economie Nationale

Meeting with Mr. Hassan Baussouta, who is responsible for environmental affairs. New legislation on environment is being prepared on the basis of the "Note sur l'Environment de Tunisie, 16 Avril, 1974, Vol. 1," which, in turn, was based on a U.N. recommendation and the Stockholm Conference Resolutions.

First priority is to the hot points (points chauds):

- o Chemical industry in Gabes
- o Industrial complex in Stax
- o Cellulose plant in Kasserine
- o Power plant in Tunis

The power plant in Tunis burns imported, high-sulphur oil which is purchased at a low price, while the cleaner Tunisian oil is exported at a higher price.

The GOT is now deciding on the form it will give the environmental protection organization it will create. It may be either centralized like the EPA in the United States, governed by each ministry for matters within its jurisdiction, or within the Ministere de l'Equippement, which is responsible for "l'amenagement du territoire." "The solid waste disposal is the worst pollution problem in Tunisia," he stated. They plan to first solve major problems without creating economic hardships or loss of jobs and then later look at pollution problems in rural enterprises. For additional details, he suggested a meeting with another department.

Service de l'Infrastructure et de l'Environment

This meeting, at the suggestion of Mr. Baussoufa, was with Mr. Moncef Kaak, who heads the department. All industries are classified in one of the following three categories, depending on the environmental risk:

First - Establissements Dangereux (Hazardous)
Second - Establissements Insalubles (Unhealthy)
Third - Establissements Incomodes (Nuisance)

All projects requiring loans from IPA/FOPRODI have to have a classification prior to implementation. The industries being considered were then presented, and Mr. Kaak classified them as follows:

Tannery - Unhealthy
Brick Plant - Nuisance
Wool Processing (carding, washing, drying) - Unhealthy
Knitting-Weaving - Nuisance
Tile Manufacturing - Unhealthy

The service also provides assistance to new industries during implementation, monitors the operation for violations, follows up complaints, and provides technical assistance on request by owners of companies on safety and environmental matters.

SUNDAY, JANUARY 30, 1977: TUNIS

AID Agronomist

Discussion with Mr. Rudy Vigil, the USAID agronomist for the project area, on the subject of rosemary exploitation (oil extraction). He believes this is a counterproductive activity because it denudes the terrain. (Plants are cut low on an annual harvest; this weakens the roots, the plants die, and then soil erosion is further accelerated.) The income from rosemary exploitation is marginal: the laborer is paid about 600 millimes per quintal or about 6 millimes per kilogram. This information had not been presented until this time.

MONDAY, JANUARY 31, 1977: TUNIS

Agence de Promotion des Investissements (API)

Meeting with Mr. Mohamed Laribi, Directeur de la Promotion, and Mrs. Radhia Bacha, Sous Direction Pays Anglophones. For the funding of the suggested service park, they recommend that a contact be made with the Agence Fonciere Industrielle. They believe this would be a difficult loan because of the natural mistrust of small, unsophisticated businessmen to working with government agencies.

Centre des Etudes Industrielles (CDEI)

This organization has 60 employees, of whom 30 are professionals. They conduct research studies by industrial sectors and disciplines.

Mr. Nejib Caabane is the Sous Directeur, and he provided some additional information. They perform the following activities: (a) provide general information to entrepreneurs on situations and resources on all regions of Tunisia, (b) conduct sectoral analysis (i.e., knitting, oil-essence extraction, leather, footwear, and others) for the government to determine if and when new investments are needed, according to the five-year plan; (c) provide specific techno-economic studies at the request of the Director General. Biggest problem of CDEI at present is lack of staff and setting priorities.

FOPRODI

This is the Fund for Industrial Promotion and Industrialization. Meeting was held with Mr. Abdelfattam Djemal, Director of the organization.

They provide assistance to applicants in preparing the loan request forms. FOPRODI has three purposes:

1. Develop new entrepreneurs
2. Stimulate small industries
3. Decentralize the economy

Additional printed information was made available by Mr. Djemal.

Appendix 2

SURVEY OF AVAILABLE INDUSTRIAL SERVICE ENTERPRISES IN PROJECT AREA

SURVEY OF AVAILABLE INDUSTRIAL SERVICE ENTERPRISES IN PROJECT AREA

1. Name of Enterprise: ATELIERS MECANIQUE-AGRICOLE

Type of Business: Auto equipment repair shop.

When Established: 1974.

Address: Rue 20 Mars 1956, Maktha.

Owner: Chedli El Garoui.

Personnel: Owner plus two apprentices.

Products and/or Services: Repair of agricultural machines, passenger cars, trucks, pickups, bulldozers, tractors, trailers, etc.

Work Schedule: 7:30-12:30 and 3:00-5:30, six days per week, all year. Heavy workload during agro season, with occasional overtime; less work in winter.

Equipment: 30-T press; welding equipment, pressure gage; gasoline and diesel engine tune-up equipment; electric power drill; hand drill; electric power grinder; vise; hand tools.

Clients: Individual equipment and car owners, and Ministry of Agriculture equipment.

Sources of Materials and Supplies: All in Tunis.

Gross Sales: 1,500 dinars per year; no indication of trends since company is so young.

Market Area: Makthar, Kessra, and Sersa.

Work Space:

Office and Storage: $5 \times 4 = 20\ m^2$

Shop: $5 \times 4 = 20\ m^2$

Has a $10\ m^2$ storage area somewhere else.

Expansion Plans: Expects to double work volume within the next five years.

Main Problem Areas:

(a) Small and inadequate work space

(b) Lack of capital to buy equipment

(c) All machining has to be done in Tunis

Comments: The owner, Mr. El Garoui, about 45 years old, is an experienced auto mechanic. He acquired his skills in Tunis and has an offer to run a car repair shop in Tunis. However, he would rather stay in Makthar, running his own shop. The current working conditions are extremely poor. The two 5 x 4 bays are actually two converted rooms (steel rolling doors) in the owner's uncle's house in the center of Makthar, where the equipment, materials, and even junk are spread at random. All work on vehicles and equipment is done in the open, on the sidewalks and street in front of the shop. Thus, in the heavy rain and after dark, all work stops. As the lack of adequate and sufficient work space is his critical problem, the owner is very much interested in moving to an industrial estate.

His savings are insufficient to obtain additional equipment, and he has no idea how to approach a bank or a government agency to solicit a loan.

Mr. El Garoui is originally from Makthar. Near the town he owns 30 hectares of land, growing wheat and barley. He would be interested in planting fruit trees, but has no time for this. He owns a six-year-old Ford tractor he maintains in perfect running condition. (A Ford Company representative told him recently there are only two such Ford tractors still in operating condition in Tunis.) Most agro equipment, according to him, breaks down after one or two years in the field.

2. Name of Enterprise: ETABLISSEMENTS SALEM BEN SAIDA

Type of Business: Carpentry.

When Established: 1973.

Address: Rue Farhat Hashed, Makthar.

Owner: Salem Ben Saida.

Personnel: Owner plus son, skilled carpenter; and one apprentice, half time.

Products and/or Services: Woodwork for buildings, mainly doors and windows, including hinges and glass panes; all on order (i.e., not ready-made products).

Work Schedule: 8-10 hours per day, six days per week, all year. Less work in winter.

Equipment: Multi-purpose drill/cutter ("combine"); vertical saw; planer; hand tools.

(The "combine," bought secondhand, is 30 years old but in excellent working condition.)

Clients: Individuals and public (government) building contractors (entrepreneurs publiques).

Sources of Materials and Supplies: All outside project area, mainly Tunis (lumber, glass, and hardware - "quincallerie").

Gross Sales: Approximately 5,000 dinars per year; business volume is growing; work paid by m^2 of finished product.

Market Area: Makthar, town and delegation.

Work Space: Single bay, 5 x 8 = 40 m^2 plus overhead (mezzanine); 5 x 4 m^2 = 20 m^2 lumber storage space.

Expansion Plans: Substantial, including furniture making (see comments).

Main Problem Areas: Lack of capital for expansion (and lack of knowledge on how to obtain it).

Comments: The owner, Mr. Salem Ben Saida, is a highly skilled carpenter, working since 1937. He still spends most of his time in the shop, although his son is doing 80% of the work. After pricing a fixture for guiding the window frame during the shutter slot cutting operation -- 1,400 dinars in Tunis -- he designed and built a cheap and simple fixture himself, and showed the team how it works.

Mr. Ben Saida's second son is now working in France as a cabinetmaker. He has saved some money (he paid for the three existing machine tools), and will soon return to open a good-size carpentry and furniture-making shop in Makthar, with his father and brother. They have already acquired the site and, consequently, may not be interested in moving to an industrial estate.

3. Name of Enterprise: AMAR BELGACE, BEN MARSUK

Type of Business: Forge shop.

When Established: 1974.

Address: Avenue Bourgiba, Makthar.

Owner: Amar Belgacem Ben Marsuk.

Personnel: Owner, plus one apprentice on contract.

Products and/or Services: Wrought iron fixtures for buildings (door and window protection/ornamental gates and screens); welding and soldering.

Work Schedule: Very uneven due to lack of equipment and orders. Less work during winter.

Equipment: Welding torch; hand drill; hand grinder; vise; miscellaneous hand tools.

Clients: Mainly individuals.

Source of Materials and Supplies: All from Tunis.

Gross Sales: Reluctant to give (or possibly does not know it).

Work Volume: Steady.

Market Area: Makthar, town and delegation.

Work Space: Single bay, 5 x 6 = 30 m^2, inadequate and messy.

Expansion Plans: None, under the present conditions, i.e., lack of space and equipment.

Main Problem Areas: Lack of equipment, that is, capital to buy it. Materials and supplies procurement from Tunis expensive and slow (because of small lots, has to wait and pool requirements and orders with others in Makthar).

Comments: Mr. Belgacem Ben Marsuk, about 30 years old, is a blacksmith who learned his trade in Monastir (worked on President Bourgiba's house there).

There are idle blacksmiths in Makthar. Thus, with adequate space and some equipment, he could expand his business considerably. He is very much interested in moving to an industrial park and, after

reading the "Industrial Estate Questionnaire," he estimated his requirements as follows:

Office Space: 3 x 2.5 = 7.5 m^2

Work Shop: 8 x 10 = 10 m^2

Storage Area: 7 (longest steel bar) x 3.5 = 24.5 m^2

Common Equipment and Services: Lathe and acetylene.

2. Name of Enterprise: MOULDI BEN BECHIR BEN YOUSSEF

Type of Business: Auto repair shop.

Address: Ruhia.

Owner: Mouldi Ben Bechir Ben Youssef.

Personnel: Owner, plus two apprentices; also available in Ruhia are a skilled (qualifie) electrician, a lathe operator, and a mechanic.

Products and/or Services: General auto and farm equipment, mechanical and electrical repair and maintenance work.

Work Schedule: Six days a week but uneven work load; much less in winter.

Equipment: Compressor (gonfleuse); welder, electric drill; grinder; O_2 cylinder; hand tools.

Clients: Local farmers and government (Delegate, Post Office, Public Works, National Guard).

Materials and Supplies: All from Tunis.

Gross Sales: 250 dinars per year.

Market Area: Ruhia, village and delegation, plus two neighboring delegations.

Work Space: 7 x 7 = 50 m^2, plus 7 x 4 = 28 m^2, empty adjacent bay.

Expansion Plans: None (without additional equipment).

Main Problem Areas:

(a) Lack of equipment, i.e., money to buy it.

(b) Costly work in Tunis, e.g., to machine an axle, has to take it to Tunis, paying 10 dinars for the round trip, wait in line for work to be done, etc.

Comments: There is a great demand for this type of operation (farm equipment and road vehicle repair and maintenance) in Ruhia and the two adjoining delegations.

Skilled personnel are available now in Ruhia (mechanics, electrician, lathe operator), but might leave for Tunis if nothing happens.

The existing shop has sufficient space and utilities.

The need for equipment is critical. The owner does not believe he can get a government loan through the Delegate's office, and there are no local banking facilities. (Besides, he has no collateral to secure a loan.)

5. Name of Enterprise: AHMED NEJLAOUI

Type of Business: Forge.

When Established: 1976.

Address: Ruhia.

Owner: Ahmed Nejlaoui.

Personnel: Owner and two sons (apprentices).

Products and/or Services: Repair of carts, tractors, kitchen equipment (primus), making of building ironworks (window and door grates).

Work Schedule: Uneven, due to lack of sufficient work.

Equipment: Welding; anvil, broken-down electric grinder.

Clients: Individuals.

Materials and Supplies: From Kasserine, Sousse, and Tunis.

Gross Sales: 200 dinars per year.

Market Area: Ruhia (so far).

Work Space: $4 \times 5 = 20\ m^2$ (messy).

Expansion Plans: None.

Main Problem Areas: Lack of work. Needs electric drill and better welding equipment.

Comments: Very primitive operation. Demand for blacksmith work does exist in the area and should be met.

6. Name of Enterprise: RACHID BEN TOUHAMI

Type of Business: Auto repair shop.

Address: Makthar (street above central marketplace).

Owner: Rachid Ben Touhami and brother.

Personnel: Two brothers and five apprentices (under three-year contract with local labor office; after completion of contract, can continue with firm as qualified worker or move on).

Products and/or Services: Repair and maintenance of farm equipment -- "all" work, except machining, done in Tunis (and any hydro-box work cannot be fixed even in Tunis but is sent back to manufacturer for replacement).

Work Schedule: Full time, except in winter.

Equipment: Welding; grinder; hand tools (originally supplied by the government rural development agency).

Clients: Farmers (government vehicles are repaired and maintained by government mechanics in their own facilities).

Materials and Supplies: All from Tunis.

Gross Sales: 1,500 dinars per year; increasing year by year.

Market Area: Makthar, town and delegation.

Work Space: 6 x 5 = 30 m^2, but most work is done outside, as there is no electric light inside. Space rental: 15 dinars per month.

Expansion Plans: New facility across the street from elementary school is under construction:

- In stone: Small office and parts store facing street, plus three 5 x 6 m shop bays (almost finished) a 10 x 6 covered area still to be added.
- In cement blocks: storage space and some inside partitions.
- Still to come: a car washing area/installation, and parking space.

All work is contracted by owner directly with stone cutters, masons, etc.

Comments: The younger brother (interviewed with the help of the Arabic/French elementary school teacher) is a Makthar Lycee dropout (after two years), while his brother is financing the new facility. Thus, may not be interested in an industrial estate.

7. Name of Enterprise: MOHAMED EL HEDI ET COMPAGNIE

Type of Business: Electric fixtures.

When Established: 1976.

Address: Rue 20 Mars 1956, Makthar.

Owner: Mohamed El Hedi.

Personnel: Owner and one son.

Products and/or Services: Sales of electric fixtures and accessories and paint; installation and repair of building electric fixtures, sale of TV sets.

Work Schedule: Six days a week, all year.

Equipment: Hand tools, exclusively.

Clients: Individuals and public agencies (mainly schools).

Materials and Supplies: All from Tunis.

Gross Sales: Unknown (new business); business growing.

Market Area: Makthar.

Work Space: $3 \times 4 = 12\ m^2$ (actually a store; all repair is done on premises).

Expansion Plans: Expansion needed but not defined.

Problem Areas:

(a) Lack of space both for display and storage of goods.

(b) Procurement of materiel from Tunis; pick-up rental 10-15 dinars per trip).

Comments: The director of the local Maison de Culture was interpreting/speaking for the owner. Mentioned that Makthar delegation has 1,500 to 2,000 TV sets and could use an electric repair shop.

8. Name of Enterprise: MOHAMED BARNI

Type of Business: Carpentry.

When Established: 1976.

Address: Rue Belahoune No. 6, Makthar.

Owner: Mohamed Barni.

Personnel: Owner and two apprentices (three brothers).

Products and/or Services: Windows, doors, chairs, night tables, shelving, cabinets.

Work Schedule: Six days per week, all year.

Equipment: Multi-purpose saw, drill, planer (2 HP French KITY); hand tools.

Clients: Individuals and local government offices.

Materials and Supplies: Mostly from Tunis; some from local store Youssef (hardware).

Gross Sales: Unknown (established about six months ago).

Market Area: Makthar, town only.

Work Space: 3 x 4 = 12 m^2; rental 6 dinars per month.

Expansion Plans: To double business volume within the next five years.

Problem Areas: Lack of space.

Comments: The shop is run by three brothers, one a skilled carpenter; the other two are still apprentices (two-year dropouts from the Makthar Technical Lycee). A fourth brother has paid for the only machine tool they have.

First reaction to suggestion of moving to an industrial park: "Do we have to go there?" (Suspicion of "co-operative" approach, government involvement, etc.)

After being told that it would be a private-enterprise, free-choice alternative to be based on economic considerations, the owner specified his space requirements as follows:

Shop: 10 x 20 = 200 m^2

Storage: 4 x 6 (maximum lumber stock length) = 24 m^2.

Appendix 3

WATER RESOURCES

DEVELOPMENT OF WATER RESOURCES

Year-round Potable Water Points without Pumps

Delegation	No.	Public Water Points	Funds Allocated (dinars)	Percent Completed
1974				
Makthar	9	Ain Ezebda (BIR)	700	100
	10	Ain El Araria	1,100	100
	11	Bir Jabnoun	1,500	100
Ruhia	19	Citerne a Jmilet	1,700	100
	20	Citerne a Jmilet (Chahda)	1,700	100
	21	Citerne a Jiljil (Fanduuk Debbiche)	1,700	100
	22	Ain Boukanna	1,300	100
1975				
Makthar	21	An Bou Grin	1,300	100
	22	Ain Ras Elmaa	1,200	100
	23	Ain Mansoura	1,500	(Replaced)
	24	Ain Oued Chikh	1,700	100
	25	Ain Oued Sddine	2,000	60
	26	Bir Makhla	1,700	95
Ruhia	9	Ain Djerissi	2,400	90
	10	Citerne Jmilet	2,000	100
	11	Ain Ben Habbes	800	100
	12	Bir Ouled Zitoun	800	100
1976				
Makthar	4	Ain Jaouadi	1,200	0
	5	Bir Ellouza	1,400	0
	6	Ain Kraimia	1,300	0
	7	Ain Oussama	1,200	15
Ruhia	11	Ain Dorgham	1,300	60
	12	Ain Chagaga	1,400	0
	13	Ain Charchara	1,500	0
	14	Ain Oued Elkouki	1,600	10

Note: Ruhia Village water comes through 20-cm diameter pipe from Sbiba.

Source: Mr. Mogaadi, Ministry of Agriculture Office, Siliana, 30 November 1976.

WATER RESOURCES
PRIVATE WELLS AND SPRINGS - PLAIN OF RUHIA

Name of Well	Number	Depth (meters)	Diameter (meters)	Salinity Level (grams per liter)
Coopérative de Production de Rohia	1	6.40	2.40	1.70
Bir Bou Toraâ	2	10.13	3.00	2.90
Bir Salah Ben Ahmed Essifi	3	6.90	4.00	2.50
Bir Romain	4	4.02	1.10	2.70
Bir Débbiche	5	8.94	4.00	1.15
Bir Abdallah Ben Ammar Ben H'ram	6	3.59	3.00	2.10
Bir Tahar Ben Hammouda	7	5.83	3.50	1.54
Bir Bou Djemaa Ben Mohamed Belgacem	8	3.26	2.00	1.08
Bir Aïfa Ben Amor	9	6.19	4.00	1.10
Bir Salah et Hmida Ben Med B.Youssef	10	6.02	3.50	1.50
Bir Béchir Ben Ali Sayari	11	5.34	3.20	0.98
Bir Mohamed Ben Amara	12	7.77	3.00	1.00
Bir Tahar Ben Taïeb Benn Tahar	12	4.64	2.50	1.10
Bir Taieb Ben Mohamed Ben Sghaier	14	5.88	4x4	0.90
Bir Hédi Ben Ali Ben Salah	15	5.38	3.00	1.00
Bir Ahmed Ben Ali Ben Salah	16	4.25	2.50	1.10
Bir Ayachi Ben Taïeb Ben Ali	17	8.09	3.00	0.92
Bir Badiri Ben Mohamed Ben Ahmed	18	6.34	3.00	1.10
Bir Amara Ben Mahmoud	19	6.88	3.00	0.83
Bir Tijani Ben Mohamed	20	6.59	3.00	1.01
Bir Tahar Ben Mohamed Ben Ahmed	21	7.05	2.50	1.00
Bir Ayadi Zagdoud	22	7.88	3.50	1.30
Bir Ayad Ben Mohamed Ben Abid	23	5.33	4.00	0.72
Bir Salem Ben Salah	24	4.12	3.00	1.10
Bir Ahmed Ben Mohamed Ben Abid	25	7.40	3.00	0.77
Bir Ahmed Ben Abid	26	9.45	2.00	0.815
Bir Ahmed Ben Mohamed Ben Belgaem	27	7.20	2x2	0.68
Bir Ahmed B. Mohamed B. Belgacem	28	5.89	2x29	0.84
Bir Kahia B. Belgacem	29	6.04	3x3	0.65
Bir Mohamed B. Ali B. Mansour	30	6.24	2x25	0.68
Bir Salah Ben Djemiâ	31	6.17	4.00	0.61

(Continued)

Name of Well	Number	Depth (meters)	Diameter (meters)	Salinity Level (grams per liter)
Bir Mizouni B. Mohamed B. Jemaâ	32	6.20	3.50	0.65
Bir Afif B. Mohamed B. Djemâa	33	5.92	3x3	0.61
Bir Ayachi B. Mohamed B. Abdallah	34	6.40	F.iring.	0.60
Bir Salah Ben Taïeb	35	6.04	déformé	0.65
Bir Béchir B. Taïeb	36	4.96	2x2.5	0.75
Bir Aïachi B. Mohamed B. Abdallah	37	5.28	3x3	0.68
Bir Salah B. Taïeb	38	4.42	3x3 déformé	0.69 1.05
Bir Hamed B. Ali B. Abdallah	39	3.94	3x3	0.82
Bir Ahmed Ben Ali B. Abdallah	40	3.99	3.00	0.70
Bir Mohamed B. Abdallah	41	3.89	4.00	0.77
Bir Mizouni Ben Mabrouk	42	3.56	3.00	-
Bir Mizouni Ben Mabrouk No. 2	43	4.54	2.50	0.75
Bir Bechir B. Taïeb	44	4.57	3.5x3.5	0.55
Bir Amar Mizouni B. Med B.Djemâa	45	6.36	4.50	0.62
Bir Puits de l'Etat	46	8.07	7.50	0.69
Bir Puits de l'Etat	47	11.31	2.5x2.5	0.43
Bir Afif Ben Amor	48	3.00	2x2	1.18
Bir Ali B. Taïeb	49	2.74	2.00	1.50
Bir Mohamed B. Romdhane	50	3.59	3.00	0.49
Bir Ayachi Ben Romdan	51	3.84	4.50	0.72
Bir Puits de l'Etat	52	7.13	3x3	0.54
Bir Belgacem Bel Kahia	53	9.69		
Bir Saïadi Ben Mohamed Saïadi	54	4.23	3x3	0.55
Bir Saïadi Ben Mohamed Saïadi	55	3.82	3x4	0.55
Bir Belgacem Ben Saïadi	56	3.83	3x3	0.595
Bir Amara Ben Ayachi	57	3.90	3x3	0.60
Bir Ali Ben Salah Ben Saïdi	58	3.97	3x4	0.60
Bir Tahar Ben Belgacem	59	4.29	2x2	1.48
Bir Arbi Ben M'hamed	60	3.04	4x3	1.70
Bir Ahmed Ben Salah	61	3.19	3x3	-
Bir Jalloul Ben M'Ammar	62	6.51	2	1.48
Bir Puits de l'Etat	63	4.39	4.80	1.85
Bir Arbi Ben Ahmed El Arbi	64	4.33	2.00	1.38

(continued)

Name of Well	Number	Depth (meters)	Diameter (meters)	Salinity Level (grams per liter)
Bir Afif Ben Ali Ben Othman	65	3.61	3.00	0.43
Bir Puits de l'Etat	66	7.37	5.00	0.71
Bir Sâad Ben Mohamed Salah	67	5.94	3.00	0.35
Bir Ammara et Arfa Ben Sâad	68	7.26	3.5x3.5	0.38
Bir Sâad Ben Mohamed Salah	69	6.89	3.50	0.90
Bir Lakdar Ben Sâad Ben Mosbah	70	8.37	4.00	1.00
Bir Abdelhafid Ben Salah B. Med	71	7.69	4.00	0.96
Bir Boubaker Ben Mâamer	72	7.09	4.00	1.00
Bir Sâid Ben Ayachi	73	6.96	4.00	1.24
Bir Béchir Ben Med Ben Younes	74	7.29	3.50	-
Bir Amor Ben Ali Cheboub	75	8.07	3.50	0.85
Bir Abdallah Ben Mohamed Salah	76	7.07	4.00	1.10
Bir Puits de l'Etat	77	8.49	4.80	1.10
Bir Puits de l'Etat	78	9.27	4.90	1.18
Bir Puits de l'Etat	79	9.27	5.00	-
Bir Béchir Ben Arroum	80	8.49	2.5	1.485
Bir Aïfa Ben Ali Bel Cheboub	81	9.27		1.25
Bir Amar Ben Mohamed Ben Amor	82	6.67	3.00	1.
Bir Tahar Ben Mustapha	83	7.53	3.00	1.
Bir El Borni	84	8.21	déformé	0.9
Bir Hnouna Ben Mohamed El Kamel	85	8.29	4.40	1.0
Bir Ali Ben Ahmed Ben Salem	86	6.54	3.00	1.05
Bir Tahar Ben Ahmed Ben Ali	88	6.15	3.00	1.05
Bir Ali Ben Ahmed	87	5.65	déformé	1.20
Bir de l'Etat	89	4.70	5.00	1.25
Bir Belgacem Ben Salem	90	7.99	3.00	1.43
Bir Abderrahman Ben Jilani B. Ali	91	7.70	3.00	1.485
Bir Salouha Ben Salah	92	10.24	2.5	1.495
Bir Salem Ben Saidi	93	12.70	2.00	2.05
Bir Mohamed Ben Kamel	94	6.44	3.00	1.98
Bir Khlifa Ben Hamed	95	7.47	3.00	1.50
Bir Lakhdar Ben Saidi	96	8.41	2.50	1.80
Bir Aiachi Ben Tahar Ben Kamel	97	6.08	3.50	2.70
Bir de l'Etat	98	6.09	3.50	1.98

(Continued)

Name of Well	Number	Depth (meters)	Diameter (meters)	Salinity Level (grams per liter)
Bir Mouldi Ben Béchir Ben Youssef	99	4.00	4.00	2.00
Bir de l'Ecole	100	5.58	1.80	-
Bir Hassouna Ben Hadj Salah	101	8.37	2.36	-
Bir Amar Ben Zeraâ	102	10.03	2.00	1.30
Bir Ahmed Ben Abdalah	103	9.56	5.50	-
Bir Massaoud	104	10.08	4x3.36	1.00
Bir S'Noussi Ben B'rahim Ben Ahmed	105	6.58	2.00	1.55
Bir Mohamde Salah Ben Hadj	106	10.92	3.96	2.76
Bir Hedi Ben Akhdar	107	2.18	4.50	2.3
Bir Hassen Ben Amor	108	5.03	2.63	2.2
Bir Sghaïr Ben Ahmed	109	17.20	2.80	0.85
Bir Salah et Ahmed Ben Salah	110	6.59	2.60	0.90
Bir Abdellatif Bel Hadj Labidi	111	8.88	3.00	0.82
Bir Mohamed Ben Salah Dallali	112	11.08	2.50	0.78
Bir Hédi Ben M'hamed	113	21.73	3.00	0.55
Bir Lakdar Ben Belgacem	114	11.78	4.00	0.59
Bir Brahim Ben Abdessalem El Mejri	115	11.48	4.00	-
Bir Abdelwahab B. Hadj Ahmed Sgaïr	116	21.94	3.20	1.18
Bir Hamed Bel Hadj Ahmed	117	19.08	4.00	-
Bir Mahfoud B. Med Salah Bel Hadj Ali (1)	118	4.02	2.00	0.70
Bir Boubaker Ben Taïeb	119	3.98	2.50	0.55
Bir Boubaker Ben Taïeb (2)	120	2.28	2.00	0.51
Bir Mahfoud Ben Mohamed Salah (2)	121	3.68	1.50	0.95
Bir Hédi Ben Mohamed Salah Ben Amar	122	12.78	4.50	1.30
Bir Redjeb Ben Mohamed Ben Salah	123	11.38	2.50	1.22
Bir Hadj Labiodh	124	5.74	2.50	1.35
Bir Ali Ben Saâda	125	11.60	2.50	0.945
Bir Amor Marzouk	126	11.52	1.20	-
Bir Tahar Lassouad	127	19.79	4.00	1.70
Bir Ali Ben Sadok	128	16.66	2.20	0.56
Bir El Hdada (Oned Haoued)	129	4.84	1.08	1.05
Bir Ammar Ben Ahmed	130	20.18	4.50	0.47

(Continued)

Name of Well	Number	Depth (meters)	Diameter (meters)	Salinity Level (grams per liter
Bir Salem Bel Karoui	131	21.18	2.50	0.77
Bir Naoura	132	17.41	3.00	1.50
Bir Ali Ben Sa'id	133	22.51	4.00	0.70
Bir Belgacem Ben Sa'id Ben Attia	134	21.51	3.00	0.58
Bir Mohamed B. Abjolloh	135	29.82	3.00	1.05
Bir de l'Ecole Primaire Hma'ima	136	15.94	9.70	0.40
Bir Messaoud Ben Belgacem Ben Helal	137	3.08	2.00	4.60
Bir Hma'ima	138	9.93	3.90	0.34
Bir Simon Faure	139	9.27	2.8	2.10
Bir Hédi Ben Chaouch	140	11.74	2.80	1.99
Bir Cénadof u.c.p.	141	4.92	2.30	2.2
Bir de l'Etat No. 1	142	2.05	2.40	1.3
Bir de l'Etat No. 2	143	3.51	2.40	1.35
Bir de l'Etat No. 3	144	3.89	2.40	1.98
Bir de l'Etat No. 4	145	3.79	2.40	1.50
Bir de l'Etat No. 5	146	3.32	2.40	0.98
Bir de l'Etat No. 6	147	3.03	2.40	0.83
Bir de l'Etat No. 7	148	2.60	2.40	0.85
Bir de l'Etat No. 8	149	2.83	2.40	3.90
Bir de l'Etat No. 9	150	4.11	2.40	1.60
Bir de l'Etat No. 10	151	4.70	2.40	1.48
Bir Youssef Labidi	152	5.83	2.30	0.99
Bir de l'Etat No. 11	153	5.93	2.40	0.50
Bir de l'Etat No. 12	154	4.89	2.40	0.52
Bir de l'Etat No. 13	155	3.89	2.40	0.75
Bir de l'Etat No. 14	156	3.30	2.40	0.71
Bir de l'Etat No. 15	157	3.16	2.40	0.76
Bir de l'Etat No. 16	158	3.13	2.40	1.20
Bir de l'Etat No. 17	159	2.93	2.40	0.87
Bir de l'Etat No. 18	160	3.25	2.40	0.89
Bir de l'Etat No. 19	161	3.31	2.40	1.05
Bir de l'Etat No. 20	162	4.66	2.40	0.995
Bir du Village. Rohia	163	7.32	2.50	1.30

(Continued)

Name of Well	Number	Depth (meters)	Diameter (meters)	Salinity Level (grams per liter)
Bir Cenadof	164	8.33	3.00	-
Bir Mohamed Ben Hlal	165	11.25	2.00	1.505
Puits de l'Oued Djediliane No. 1	166	12.15	2.00	0.90
Puits de l'Oued Djediliane No. 2	167	4.71	2.00	0.80
Puits de l'Etat	168	6.03	2 m	2.00
Bir Jilani Ben Chedli	168 bis	4.04	3.00	1.200
Puits de l'Etat	169	4.62	2.00	2.25
Brahim Ben Youssef Doua	169 bis	7.29	4 m	1.10
Puits de l'Etat	170	5.49	3 m	1.50
Puits de l'Etat	171	3.67	1.80	1.450
Puits de l'Etat	172	6.24	3.50	2.20
Puits de l'Etat	173	8.82	3.50	1.35
Puits de l'Etat	174	7.57	3.50	0.980
Puits de l'Etat	175	5.41	3.00	1.150
Puits de l'Etat	176	5.47	3 m	1.90
Puits de l'Etat	177	6.09	3.00	2.00
Puits de l'Etat	178	8.40	3.00	2.10
Puits de l'Etat	179	9.82	3.50	1.20
Mohamed Ben Boubaker Ben Youssef	180	5.00	3 m	3.50
Amor Bel Hadj Youssef	181	3.03	2.50	10.30
Najem Ben Mohamed	182	3.29	2.35	2.70
Mohamed Salah Ben Saïdi	183	4.71	2.50	1.495
Brahim Ben Saïdi	184	2.71	2 m	-
Salah Ben Ammar	185	3.77	2.50	0.660
Ali Ben Hassen Bel Arbi	186	3.49	3 m	0.725
Abdallah Ben Saïdi	187	3.49	2.80	0.750
Najid Ben Hammoude Ben Mohamed	188	3.49	2.50	0.660
Mohamed Ben Hamed Ben Mabrouk	189	3.69	2.50	0.550
Arbi Ben Mohamed Ben Almed	190	3.69	2.50	0.645
Belgacem Ben Hassen	191	3.33	3.00	0.510
Belgacem Ben Hassen	192	2.84	2.50	1.700
Ahmed Ben Salah	193	3.26	4x2	-
Arbi Ben Mohamed El Arbi	194	3.39	3.00	1.495

(Continued)

Name of Well	Number	Depth (meters	Diameter (meters)	Salinity Level (grams per liter)
Abessalem Ben Ali Ben Baâmar	195	2.67	5x2	1.250
Salah Ben Ammar Bel Kamel	196	4.99	3.00	0.710
Tahar Ben M'Ammar	197	7.55	3.00	-
Bir Tahar Bey	198	2.31	4 m	1.00
Mizouni Ben Amara	199	5.07	3.00	2.45
Ali Bel Hadj Med. B. Shedli	208	2.41	1.60	0.50
Younés Bel Hadj Abid	211	13.46	1.90	12.76
Sidi Ali El Bahloul	223	3.12	1.60	0.60
Khalifa B. Med. B. Ahmed	224	3.19	1.50	0.89
Essifi B. Belgacem B. Mansour	225	1.00	1.80	0.60
Bir El Hnidet	233	6.59	2.00	0.82
Bir Echlaïbia	234	11.04	3.50	1.26
Bir El Amech	235	1.57	0.60	2.66
Abdelhafid B. Tlili	236	17.17	2.50	0.62
Bir Sidi Abbés	237	15.54	3.00	0.40
Lazhar B. Belgacem	238	3.40	4.00	2.00
Bir Aïn Bou Djeniba	239	2.95	4.50	0.39
Bir El Touahria	240	16.66	2	0.44
Bir Touahria	241	29.74	1.40	1.30
Sghaïr B. Tahar	242	23.89	2.50	0.370
El Hadj Bou Mnijel	243	23.59	3.00	0.51
Bir Lazhar	244	1.29	2.00	3.2
Med. El Hédi El Ouartani	247	10.34	3.00	0.34
Hadj Aïachi B. Ablallau	249	18.96	2.00	0.65
Belgace B. Abdallah	250	16.19	2.00	0.44
Hadj Tahar Ben Alfa	251	17.21	2.00	0.38
Bir Ouled Guana	252	12.96	2.00	0.34
Bir Lakdhar B. Iamaïl	276	2.66	4.00	0.46
Zarronk Ben Youssef	277	15.59	4.00	1.90

Name of Spring	Number	Flow (liters per second)	Salinity
A. Bou Dabbous	200	1	410
A. El Hadid	201	2.5	500

(Continued)

Name of Spring	Number	Flow (liters per second)	Salinity
A. Babouch	215	3	610
A. Sidi Thabet	245	7.5	270
A. El Kseïba	246	17	550
A. El Kréria	-	Faible	220

Source: Mr. Mogaadi, Ministry of Agriculture, Siliana, 30 November 1976.

Appendix 4

MASTER PLANS

REPUBLIQUE TUNISIENNE
MINISTERE DE L'EQUIPEMENT
SUBDIVISION DE LA CONSTRUCTION
DE SILIANA

VILLE DE MAKTAR
PLAN D'AMENAGEMENT DE LA VILLE

ECHELLE 1/2000

K MA
PA7

PLANIMETRE

LEGENDE

ZONE RESIDENTIELLE
AVEC SERVITUDE AVEC STATUT SPECIAL

AFFECTATIONS PARTICULIERES
- RESIDENTIELLE ISOLEE
- RESIDENTIELLE CONTINUE
- RESIDENTIELLE GROUPEE

ZONE NON URBANISEE
AVEC SERVITUDE AVEC STATUT SPECIAL

AFFECTATIONS PARTICULIERES
- CULTURES NON SPECIALISEES
- CULTURES SPECIALISEES

ZONE PRODUCTIVE
AVEC SERVITUDE AVEC STATUT SPECIAL

AFFECTATIONS PARTICULIERES
- INDUSTRIE
- DEPOTS
- EXTRACTIVE
- ACTIVITES ARTISANALES
- MARCHE HEBDOMADAIRE
- MARCHE EN GROS
- MARCHE AUX BESTIAUX
- ABATOIR

ZONE TRANSPORTS
AVEC SERVITUDE AVEC STATUT SPECIAL

AFFECTATIONS PARTICULIERES
- CHEMIN DE FER
- TRANSPORTS ROUTIERS
- PONT
- AERODROME

ZONE CIVIQUE
AVEC SERVITUDE AVEC STATUT SPECIAL

AFFECTATIONS PARTICULIERES
- ACTIVITES ADMINISTRATIVES
- ACTIVITES ASSOCIATIVES, CULTURELLES ET DU CULTE
- ACTIVITES COMMERCIALES, AFFAIRES, HOTELIERES
- MARCHE JOURNALIER

ZONE MILITAIRE
AVEC SERVITUDE AVEC STATUT SPECIAL

ZONE VERTE

AFFECTATIONS PARTICULIERES
- PARCS ET JARDINS PUBLICS
- TERRAINS DE SPORTS
- PARCS ARCHEOLOGIQUES
- CIMETIERES
- ACTIVITES ADMINISTRATIVES
- ACTIVITES ASSOCIATIVES CULTURELLES ET DU CULTE
- ECOLES
- ACTIVITES SANITAIRES

- LIMITE ADMINISTRATIVE
- LIMITE DE ZONE
- PERIMETRE DE STATUT SPECIAL
- LIMITE D'EMPRISE
- LIMITE DE SERVITUDE

EMPRISE DE LA ROUTE

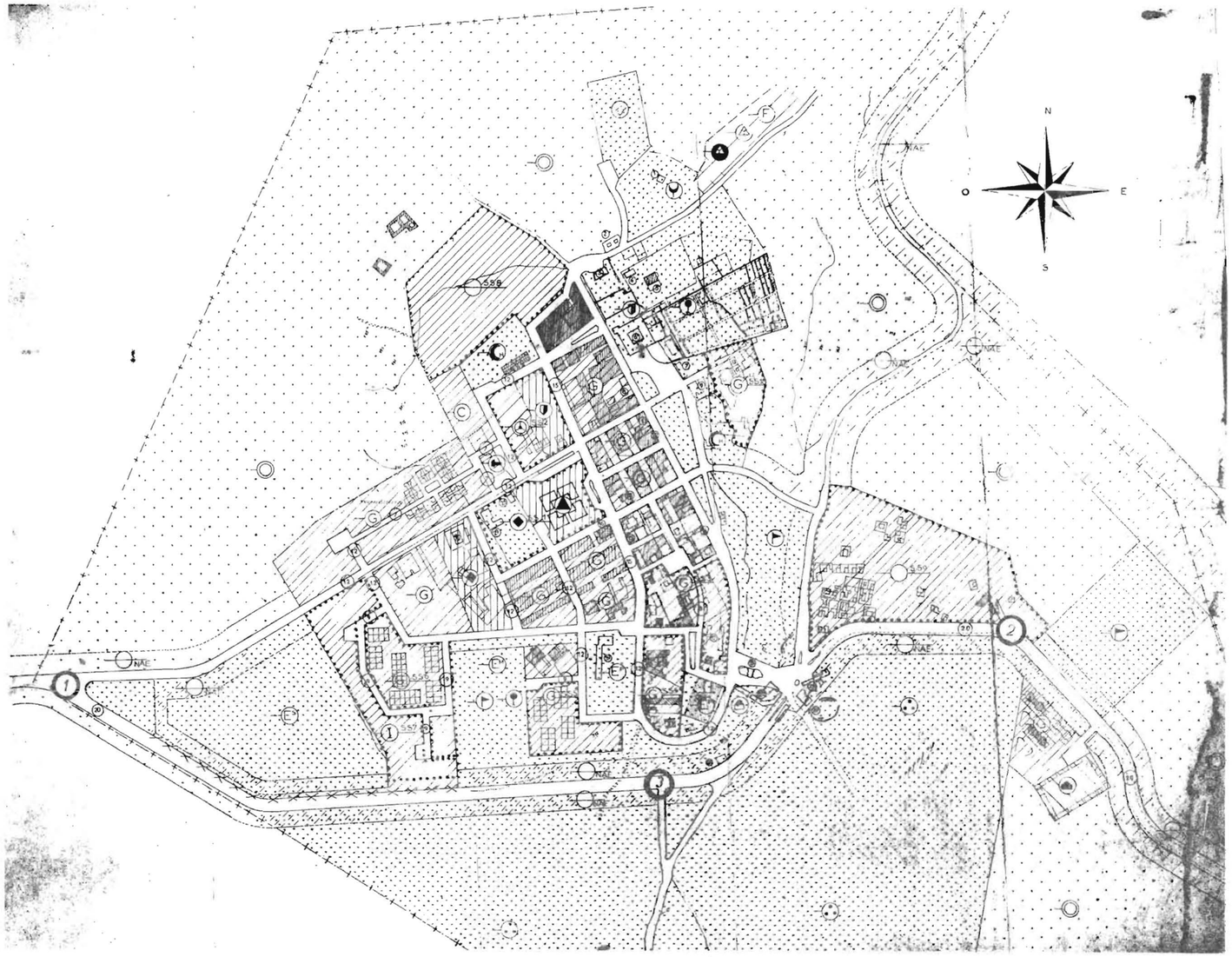
EMPRISE DE LA ROUTE AVEC PROPOSITION DE PLANTATION D'ARBRES

(3) SECTEUR A ETUDIER EN DETAIL (AVEC NUMERO D'ORDRE)

SERVITUDES
- SERVITUDE DE PORTIQUE (PERMANENCE DE L'ALIGNEMENT)
- NAA " DE NE PAS MODIFIER L'ASPECT
- NAT " NON ALTIUS TOLLENDI
- PRO " DE PROTECTION
- NAE " NON AEDIFICANDI
- STR " SPECIAL TRANSITOIRE
- PLA " DE PLANTATION
- " DEFENCE D'ACCES

EXEMPLIFICATION DU GROUPEMENT DES INDICATIONS CONCERNANT CHAQUE ZONE DELIMITEE SUR LE PLAN D'AMENAGEMENT.

MAKTHAR PLAN D'AMENAGEMENT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RUHIA PLAN D'AMENAGEMENT